

# ENERGY

DIGITAL

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*ASSESSING IVANPAH:*  
**WHY IT'S TOO EARLY  
TO CALL THE PROJECT  
A FAILURE**

*TOP 10:* **TECH  
COMPANIES USING  
GREEN ENERGY**



## **WHY STORAGE MATTERS**

THE NEXT STEP  
FOR RENEWABLES

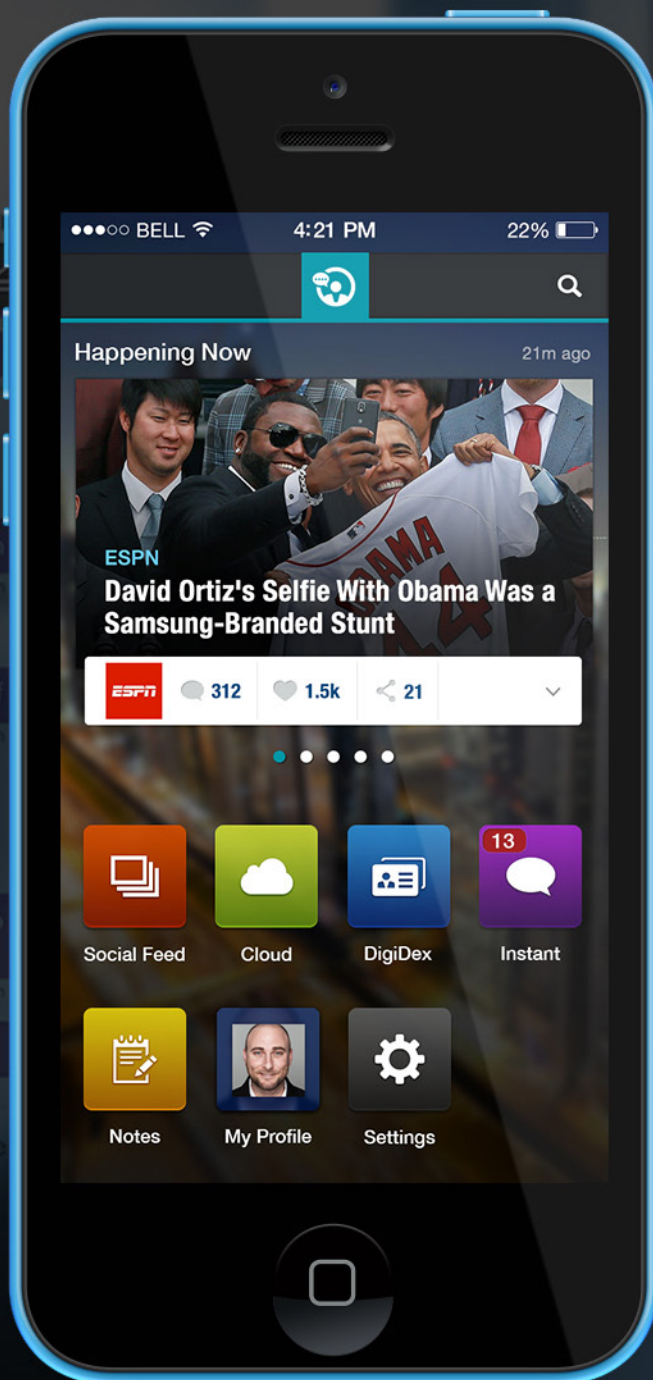


Special Reports: **CELESC & Kokish Hydroelectric Project**



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# Storage Is ***THE FUTURE***

**IF THERE'S ONE TOPIC** in renewable energy that will be important for 2015, it's storage. Storing energy is key to its long-term success. So, to start things off in the new year, we wanted to explain and examine just why storage matters so much.

To do so, we spoke with California-based company Imergy Power Systems—a leader in the field of energy storage. Their ESP30 battery is being deployed around the world and could change the face of the energy landscape.

Also this month, we cut through the noise surrounding the Ivanpah Solar Power Project, an innovative thermal power system that isn't performing as well as some hoped. However, with some calling the project a failure, we explain that it's certainly too early to do so.

Finally this month, we'll look at the top 10 tech companies using green energy. The world is getting greener and these major tech companies are helping to lead the way.

Enjoy the issue and happy new year!

*Kevin Smead*

*Editor*

kevin.smead@wdmgroup.com

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**Dr Louise Wong,**  
International Board Member

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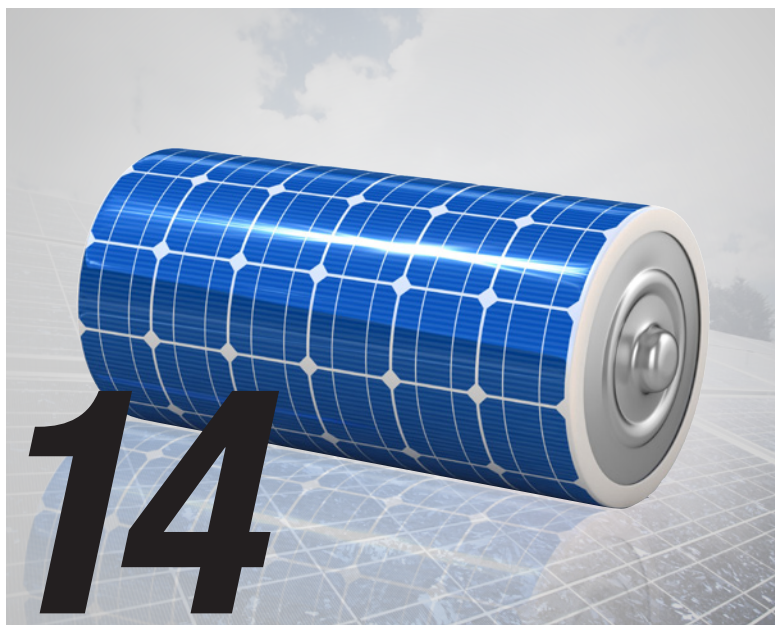
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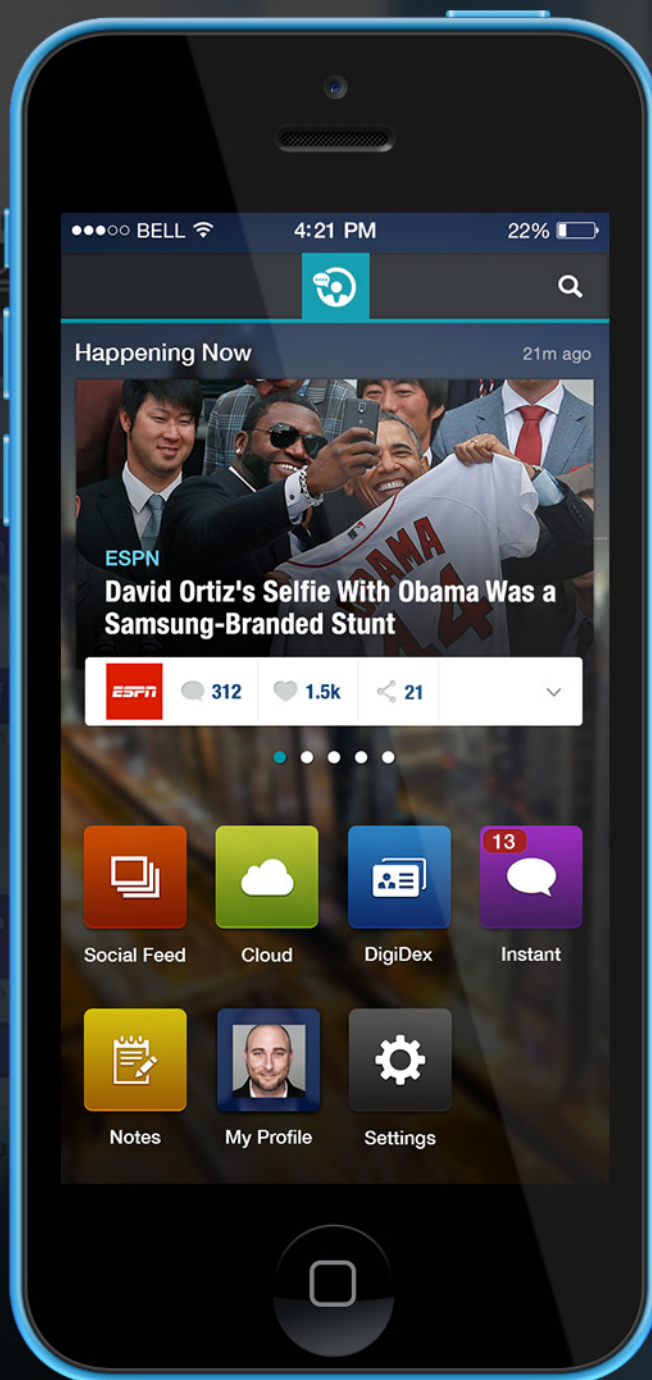
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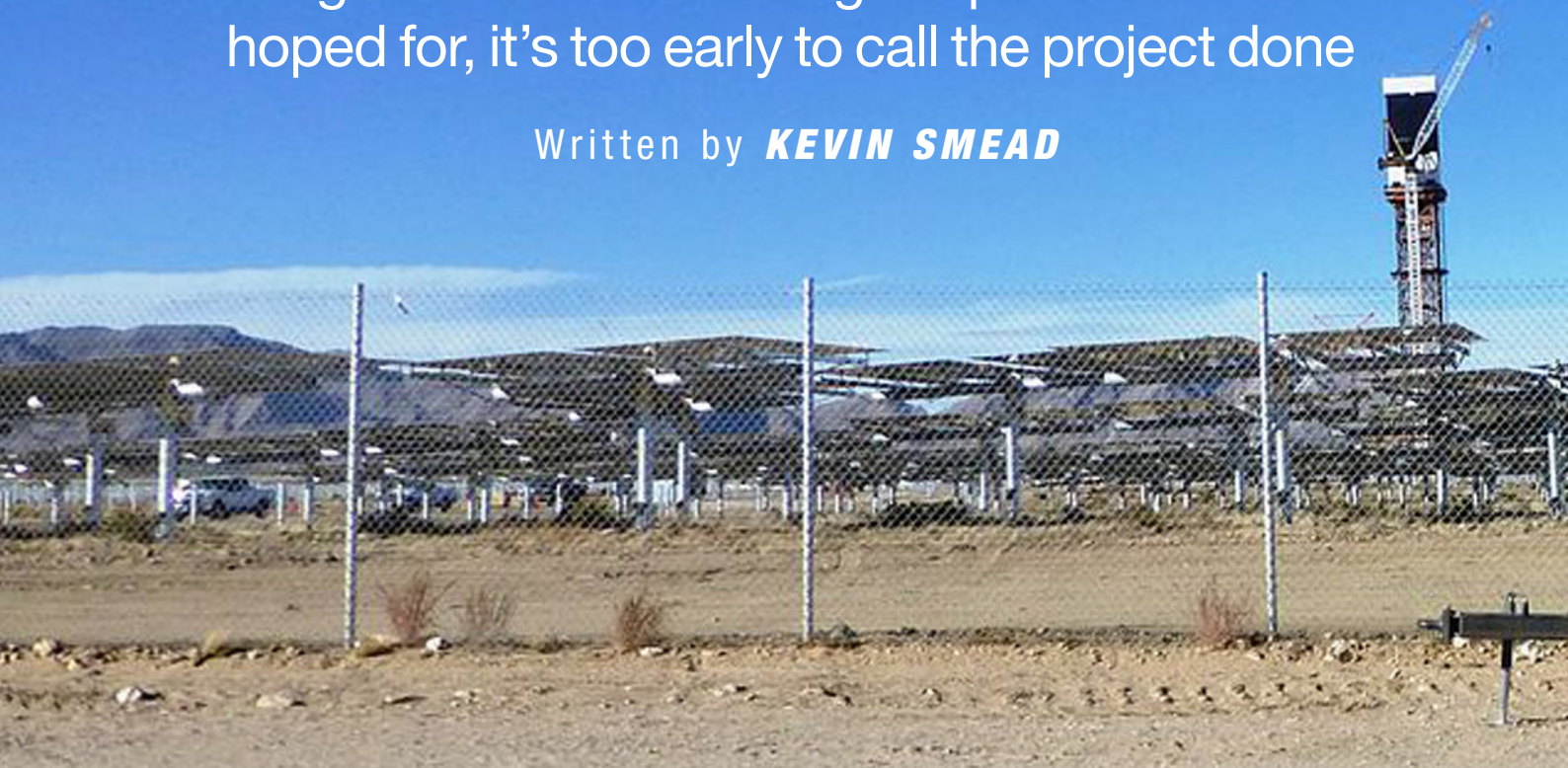
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# ASSESSING IVANPAH: WHY IT'S TOO EARLY TO CALL IT A FAILURE

Though this major project from Google, NRG Energy, and BrightSource isn't seeing the performance some hoped for, it's too early to call the project done

Written by **KEVIN SMEAD**



**CHANCES ARE YOU'VE** already heard the recent news about the Ivanpah Solar Power Project and its less-than-stellar, worse than expected performance. The project is noteworthy not only for those involved—its three major investors are Google, NRG Energy, and BrightSource—but also for its new, innovative thermal solar technology, which focuses

sunlight on a centralized tower.

Still, tongues were sharp as the media offered its take on the project's shortcomings, with some equating major investors' application for a \$539 million federal loan to help repay the \$1.6 billion federal grant funding the project to a "bailout"—a word forever tainted in the American lexicon by the 2008 financial crisis.





## The B-Word

“This is an attempt by very large cash generating companies that have billions on their balance sheet to get a federal bailout, i.e. a bailout from us—the taxpayer—for their pet project,” Reason Foundation VP of Research Julian Morris told Fox News. “It’s actually rather obscene.”

Some took issue specifically with

the technology present in the project, saying photovoltaic panels and even nuclear energy are more efficient than Ivanpah’s unique system.

In his article “Thermal Solar Energy -- Some Technologies Really Are Dumb,” Forbes contributor James Conca expressed his particular distaste for the technology in place at Ivanpah. He believes the

thermal solar system costs far too much for such a minute return.

More egregious to Conca is the private sector's plea for help from the federal government because of thermal solar's perceived failings, writing that he's "not sure why these billion-dollar companies need our help paying off a loan of that size." However, Conca was clear in saying that it wasn't the loan itself he was unhappy with, citing its purpose as allowing for testing of new technologies such as Ivanpah's.

"What I don't like is additional bailouts at our expense," he explained.

"Google, NRG and BrightSource are billion-dollar companies that need to feel their own pain so they don't build another one of these things. That's how it's supposed to work. If we feel the pain for them, they won't learn."

Sure, there's a sticky financial situation these companies find themselves in, but the answer as to why the plant isn't performing couldn't be any simpler.

### **Cloudy Skies**

"Factors such as clouds, jet contrails and weather have had a greater impact on the plant than the owners

*The glowing thermal towers produce most of the plant's energy*





anticipated,” the California Energy Commission said in a statement.

In other words? It’s just not sunny enough.

While Google and NRG were mostly silent on the subject, the third major investor, BrightSource—whose technology largely powers the plant—was quite open about the past and present struggles of Ivanpah.

“As with any new plant, there have been some equipment challenges which impacted plant availability, although we have seen a consistent improvement in performance since the plant went on-line earlier this year,” the company said. “Since the early planning stages of this one-of-a-kind project, we knew there might be some growing pains along the way, but through continued learnings and our ongoing improvement process, the units are performing better than some of our initial assumptions.”

Bad weather and untested tech do not for a good power plant make. Couple that with the project’s increased reliance on natural gas and alleged flash-frying of birds and you’re left with what looks like a big, unfortunate, solar-powered mess.

Realistically, though, is that the case?

***“As with any new plant, there have been some equipment challenges which impacted plant availability, although we have seen a consistent improvement in performance since the plant went on-line earlier this year”***

- Brightsource

In her article “Earth to BrightSource: Give Up, The Media Will Never Get Ivanpah Right,” Tina Casey calls all of these claims crafty spin-doctoring on the part of the anti-renewables media.

“Apparently, Fox characterized the payoff process as a ‘bailout’ in the form of a federal grant,” she writes. “Ivanpah qualifies for a 30% Investment Tax Credit now that it’s operating, and the terms of its loan guarantee require it to use those proceeds to pay down the loan. But, bailout sounds a lot sexier, so how are the story editors supposed to resist that?”

Casey goes on to point out the long-term nature of the project and the unrealistic expectation that a plant based on new, large-scale tech would be at 100 percent operating capacity immediately. She's not thrilled about the use of natural gas, however.

"Perhaps someday in the sparkling green future Ivanpah will wake up every morning to the tune of renewable biogas from a landfill or a dairy farm or whatever," she mused, "but in the meantime fossil gas it is."

What it all comes down to is this: is Ivanpah a failure?

### **A Sunny Blunder?**

The short answer is no, at least not yet.

The Department of Energy loan funding Ivanpah is designed for projects that utilize technologies that

***'Overall, Brightsource remains confident as it looks overseas for more business, still insisting the project will produce energy enough to be competitive here at home'***

are past the experiment stage, but remain untested on a commercial scale. And as NRG spokesman Jeff Holland explained, the four-year ramp-up period for the project was disclosed publicly beforehand and is even outlined in the agreements the plant has with Southern California Edison and Pacific Gas and Electric.

To call a project dead or failed not even a quarter of the way into its ramp-up period would be rash and shortsighted.

"As far as plant operations," Holland explained, "I think we've produced about 200,000 MWh to date at Ivanpah in the first 175 days of operations. And that's been a bit in line with our thinking."

There were also tests of equipment being conducted during this generation period, which could be part of the reason for lower numbers.

"We did have planned outages for testing, so even though we were technically online, there were still some testing items for some of the equipment that we wanted to make sure was completely synced up after full operations commenced," Holland noted. "And so they would do various testing on heliostat





***The facility is located in the Mojave Desert in Southern California, close to the Nevada border***

fields, on focusing of the mirrors, heat intensity, things like that.”

However, the solution for Ivanpah is more complex than just, “It needs to be sunnier!” While the generating potential of the tech is maybe not quite up to snuff, the greatest opportunity for Ivanpah would be the integration of energy storage. That way, the plant could store energy when it’s sunny and use it when it’s not.

Overall, Brightsource remains confident as it looks overseas for more business, still insisting the

project will produce energy enough to be competitive here at home.

“We remain confident that over time the sun at Ivanpah will be more than sufficient for the plant to meet its expected performance targets,” the company’s statement said.

Right now, the project’s ultimate future is rather uncertain, though the parties involved—especially Brightsource—seem optimistic. To call it a failure now would be like landing a plane before it even gets off the ground. ■



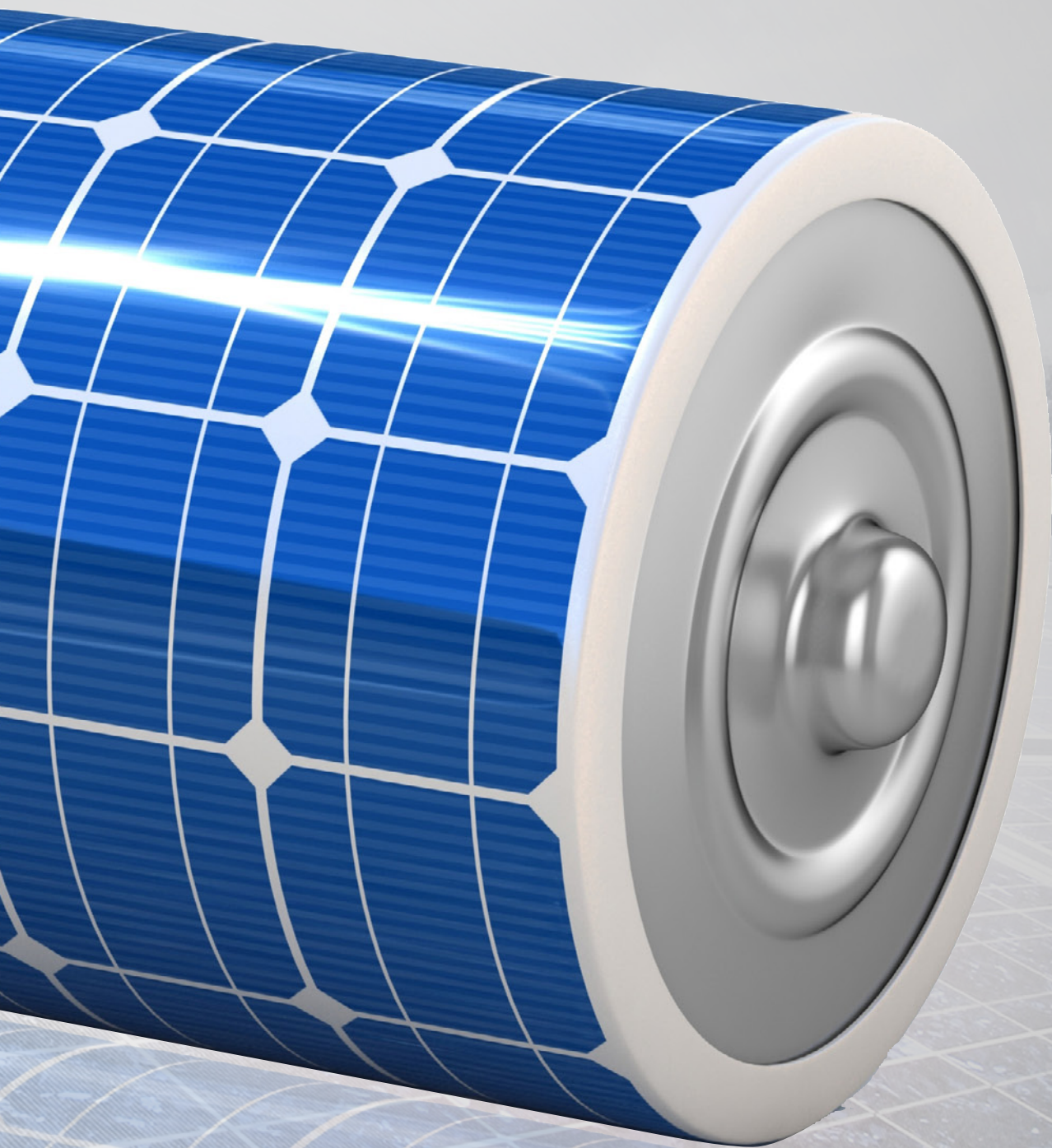
**RENEWABLES**

# ***WHY STORAGE MATTERS***

THE NEXT BIG THING FOR  
RENEWABLE ENERGY ISN'T  
A TURBINE OR A PANEL –  
IT'S A BATTERY

Written by **KEVIN SMEAD**







### RENEWABLE ENERGY, BY

nature, is unreliable. Solar panels require sunlight, wind turbines require wind, hydroelectric requires flowing water and so on. Unfortunately, not all of these are always readily available. In somewhere like Scotland, which is a generally cloudy country, solar power isn't a preferable choice of renewable energy. California's drought is wreaking havoc on the hydroelectric industry.

On the other hand, sometimes there can be abundance of sunlight or wind,

which results in the production of more energy than needed. Currently, this excess energy is often times not being used and is essentially wasted. This is often a major criticism of renewable energy and one the industry has been working to address for some time.

As it turns out, the solution is a concept we're all familiar with: storage.

### Saving it for Later

While the science and engineering behind energy storage is quite complex, the idea is simple. For example, a solar farm with a storage system—say, a large battery—can save up that extra energy generated during sunnier days and use it on the days on which less energy is generated. This solves much of the problem with the intermittency of renewable energy.

The applications are also extremely broad, with storage serving a purpose in both the commercial and residential sectors. In the residential solar sector, storage is expected to see a tenfold growth by 2018. In part, this is because the incentives to have a home solar storage system are so great. Not only does it allow for energy independence during times of crisis, but even using stored energy daily



*Storage of energy generated by renewable energy can help take some stress off of the energy grid, especially at peak hours*





Li-ion BATTERY PACK

*Lithium Ion batteries are effective for small-scale storage solutions, but not so much on a larger one*

***‘In somewhere like Scotland, which is a generally cloudy country, solar power isn’t a preferable choice of renewable energy. California’s drought is wreaking havoc on the hydroelectric industry’***

rather than buying energy from the grid can lead to major cost savings.

“Another thing that can help make the solar plus storage combo attractive sooner is time of use (TOU) pricing,” Zachary Shahan wrote for CleanTechnica. “Electricity demand is greater in the afternoon and early evening. Some utilities have switched to charging more at high-demand times and less at low-demand times, like in the middle of the night. This makes a lot of sense, but it also makes storing electricity generated at lower-demand times, like the morning, and using it at peak demand times more sensible.”

Not all countries will see this major growth, however. There are several major regions that will be the largest drivers of this transition. In particular, Germany, Australia, Italy, and the UK, are expected to account for 40 percent of the growth by 2018, with California and Hawaii expected to be important markets.

Also driving this growth is the falling cost of the batteries themselves, with lithium ion expected to see a major drop in the coming year.

“My personal view is that we underestimate the impact of storage,”



*Imergy's ESP30 battery can store up to 200 kWh*

John Ryan, an associate secretary of the federal Department of Industry in Australia, said. "We are starting to see it with hybrid vehicles and I think we'll see bigger changes."

### **Imergy Power Systems**

One company making strides in the storage of energy is California-based Imergy Power Systems.

Imergy Power specializes in a proprietary, vanadium based flow battery system, which is the most cost-effective energy storage technology available today. The flow batteries store energy in a liquid

***'Imergy's systems are going in several places around the world, including California and Hawaii. Oncor, another company working on storage solutions in Texas, are also deploying a large-scale project, though it's up to the public utilities commission in Texas whether it moves forward'***



electrolyte that circulates between tanks, allowing for a simple design that creates a robust and efficient system that can be cycled thousands of times in a year, and charged and discharged completely without impact on its lifespan. This also allows for customizable sizing for the batteries, allowing each storage project to be tailored to its specific needs. Its latest project is the long-term storage battery called the ESP 30, which can store up to 200 kWh of energy.

Also unique about Imergy's battery is its utilization of a single element: vanadium. Other batteries, such as a car battery or lithium ion battery, utilize multiple elements. The vanadium can act in four different phases, essentially allowing it to act as two different elements.

"Why that is important is very simple," Imergy President Tim Hennessy explained. "All batteries die after time. The natural reaction that occurs in the charging and the discharging causes damage to the elements or the structure within the battery. If you leave your car lights on all night, you come back in the morning and you just can't get that battery to ever recover. The same

thing happens if you discharge your cell phone rapidly by taking the battery from 100 to 0 percent very rapidly. You'll find you don't get a recovery in the cell battery life."

### **Imergy's Vanadium Advantage**

According to Hennessy, the vanadium battery doesn't have this type of impact because it's vanadium on both sides.

"In 100 years time," he said, "whatever you put in there is what you'll get back. All the bad things that can be thrown at it that we see in the real world can be thrown at it and it will continue to function."

Vanadium can also be obtained sustainably from waste sources, making it a greener option.

"That's the Imergy difference," Hennessy said. "They all require incredibly pure vanadium, around 99.6 percent pure. What we have done is created the same vanadium benefits, but we've gone three steps further."

The first step of that is the reclamation of less pure vanadium from waste such as fly ash or mining slag that can be used in the batteries. This leads to a major decrease in cost without sacrificing of quality. This is also preferable because of its

sustainable nature. Also important is the ability of the batteries to operate at high temperatures—up to around 130°F Fahrenheit—without needing to cool it. Finally, and perhaps most importantly, with Imergy's battery, there is no degradation, allowing for long-term deployment in more extreme regions.

Hennessy said for storage to be truly successful, it needs to allow for the proper distribution of power during peak times of day, which are generally from 4 to 7 pm. This is demonstrated in what's called the "Duck Curve," or the chart showing the peak hours of energy generation and its potential overgeneration. By storing the extra power generated during the day

and using it then, it's possible to reduce demand from the grid and ensure power is distributed evenly, rather than in the shape of a duck.

"You look at distribution by going down to the end users and addressing the issues there," Hennessy explained, "which cumulatively add up at the top to help the overall grid by reducing the peak demands that the grid faces. That has a massive impact on what we do and what we need as a society."



*Corporate video: Imergy Power Systems*





## Interview with Imergy's CEO

### Storing the Anticipation

Imergy's systems are going in several places around the world, including California and Hawaii. Oncor, another company working on storage solutions in Texas,

are also deploying a large-scale project, though it's up to the public utilities commission in Texas whether it moves forward.

"Is an unprecedented energy storage deployment on the horizon for Texas?" asks Scientific American's Robert Fares. "That depends on the Public Utility Commission. Regardless, I think it is clear Oncor's proposal

has the potential to fundamentally change how we make and distribute electricity in the future."

But Forbes contributor Peter Kelly-Detwiler believes that stories such as these storage project deployments won't be noteworthy for much longer.

"Whether for small systems or large ones, the announcements for projects will accelerate until they are soon no longer newsworthy," he wrote. "The storage market appears poised to take off with very real and cost-effective solutions."

In the world of renewable energy, storage very much matters and it's time to take note. ■

TOP 10

# TECH COMPANIES

## Using Green Energy

With so many tech companies looking to make their operations more environmentally friendly, we count down the top 10 already using green energy

(Figures and statistics from the U.S. EPA)

Written by: **Kevin Smead**









# 10

## SAP AMERICA

SAP is a world leader in enterprise software and software related services. The company uses 86,000,000 kWh of green energy annually and is committed to sustainable practices in its operations. “As an exemplar of sustainable companies we have decided to purchase over 350 gigawatt-hours of renewable energy worldwide to power all of our data centers with renewable energy sources,” the company writes. “SAP’s goal is to get our carbon footprint back to the level it was at in 2000.” For a company whose operations are as broad as SAP’s, it’s a lofty goal—but absolutely possible with the talent available to them.



# 09 SONY CORPORATION OF AMERICA

Sony is a major purchaser of green energy, utilizing more than 88 million kWh annually. This is enough power to meet roughly 37 percent of its annual energy usage. For such a large organization, this is quite impressive. The number one principle for Sony when it comes to green energy is reducing its negative environmental impact.

“The purchase of renewable energy credits is an important step in our company’s effort to reduce its environmental impact,” Dave Rubenstein, President, Sony DADC Americas, said. “With this purchase, we are able to support Sony’s environmental goals and also promote the use and growth of renewable energy in the U.S.”

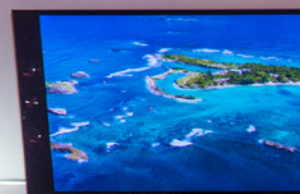
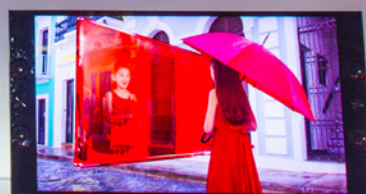
**Sony’s  
green efforts  
come with the  
goal of reducing  
its environmental  
impact in  
mind**

# SONY

make.believe

SONY

Feel the Beauty **BE MOVED**



## 08 EMC CORPORATION

Telecom company EMC believes that making the world a greener place is part of its corporate responsibility. Energy efficiency and green solutions are major factors in its business and throughout its work in all things IT, they are always at the front of its mind. Every two years, the company seeks feedback from its various stakeholders in how they could become a more sustainable business. The company compiles this data and uses it to prioritize its sustainability efforts moving forward. They've also set sustainability targets for 2020, which include reducing greenhouse gas emissions and utilizing more green energy.

The image shows a large, blue, three-dimensional logo of EMC² mounted on a light-colored building facade. The logo consists of the letters 'EMC' in a bold, sans-serif font, followed by a superscripted '2'. A small registered trademark symbol (®) is visible to the right of the '2'. The building has large windows and a modern architectural style.A green circular callout with white text is positioned in the lower-left corner of the image. The text reads: 'EMC asks those it does business with where they believe it could go greener'. The circle is semi-transparent, allowing the building facade to be seen through it.

**EMC asks  
those it does  
business with  
where they  
believe it could  
go greener**





## 07 SPRINT

Perhaps the most notable aspect of Sprint's usage of green power is its commitment to reduce its greenhouse gas emissions 20 percent by 2017, making them the first company to announce such a plan. This is only part of its goal, though, as Sprint aims to reduce its overall greenhouse gas emissions by 25 percent. The company's CEO, Dan Hesse, is also a major advocate of green energy usage, speaking on the topic frequently. These are just two of the ways, however, that Spring is going green. "Over the past decade," the company writes, "Sprint's involvement with clean energy has included installation of on-site clean-energy facilities, partnering with energy-research institutions to research clean-energy alternatives for back-up power at sites, advocating in support of clean-energy opportunities, purchasing renewable energy through utility partnerships, and investing in Renewable Energy Certificates (RECs)."



**A Dell  
Percision  
Workstation, one  
of the company's  
latest business-  
focused  
products**

## 06 **DELL**

Dell believes that while technology can make the world a better place, it also needs to be in line with environmental standards. The company holds all of its products to high environmental standards and sources smart, sustainable materials.

“We hold ourselves to the world’s toughest environmental standards such as Europe’s RoHS and REACH,” the company writes. “And we go beyond these standards with our chemical use policy by reducing or eliminating other substances even if they are not restricted.”

Nearly half of energy used by Dell is green at 228,262,000 kWh annually.



## 05 CISCO SYSTEMS

With electricity accounting for 85 percent of Cisco's greenhouse gas emissions, green energy usage is incredibly important for Cisco. Though it uses a large quantity of green energy, the company is looking to ramp up its efforts. It recently announced plans to reduce electricity emissions to 50 percent by 2017 and have its global energy usage be 25 percent renewable through the end of the 2017 fiscal year. "Going forward," the company writes, "Cisco will continue to communicate the meaningful role that green power plays in its sustainability strategy as well as within the IT industry at large."



**Cisco is a large consumer of electricity and believes using more green energy is vital to reducing its carbon footprint**

# 04 APPLE

While it's not the largest consumer of green energy, Apple is one of the most efficient. As it is, it utilizes 626,315,500 kWh of green power annually. Also, it aims to have a neutral carbon footprint very soon. It's recently taken steps such as the purchase of several solar farms to make its data centers entirely sustainable. It's also working to make all of its retail stores entirely sustainable, and is coming closer to that reality daily.



**Apple's stores, such as this one, are powered by renewable energy**





## 03 **GOOGLE**

Google is one of the biggest proponents for green energy in the world, having been a carbon neutral company since 2007. It utilizes 737,364,727 kWh of green energy annually and its data centers use roughly half the energy than a typical data center. Where it really shines, though, is in its driving of renewable energy innovation, committing vast amounts time and money to finding better sources of energy.



## 02 MICROSOFT

Utilizing more than 1.3 billion kWh of green power annually, Microsoft is one of the greenest companies in the world. The company has ambitious goals for going green and is working toward them daily. The company is also working on solutions for greener business, such as its Dynamics AX, a tool for helping businesses manage their sustainability goals in a user friendly format.





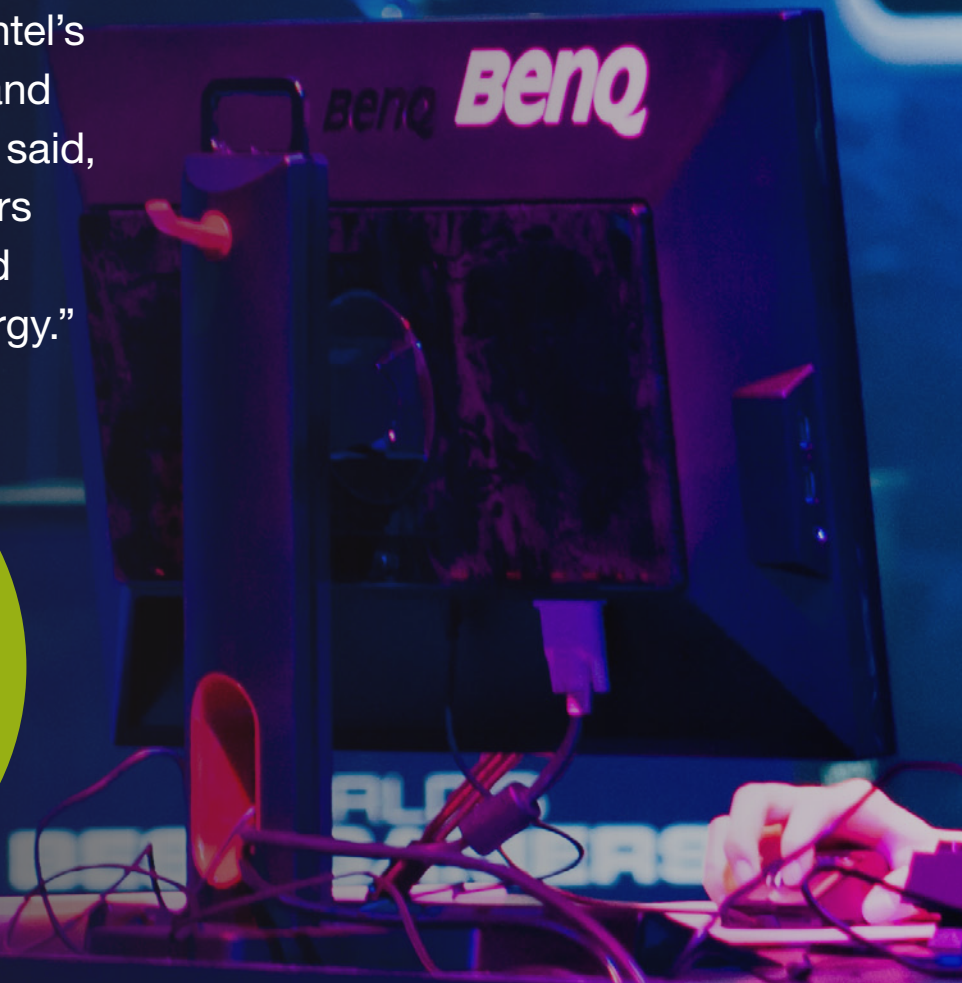
**Microsoft is looking to compete with Apple in more ways than just with its Surface tablet—it's taking the company on in its usage of green energy**

“Microsoft’s commitment to carbon neutrality is another step in the company’s broader commitment to environmental leadership,” the company writes, “from reducing energy consumption in facilities and data centers, to working with partners in the supply chain, to improving the efficiency of its software products and services.”

# 01 INTEL

Intel utilizes a massive amount of renewable energy at a whopping 3,102,050,000 kWh annually. It uses energy from a number of different sources, such as solar, wind, hydro, and biomass. It even operates 18 on site solar panels with a capacity of 7,000 kW. “Our renewable purchase is just one part of a multi-faceted approach to protect the environment,” Intel’s Director of Global Utilities and Infrastructure Marty Sedler said, “and one that we hope spurs additional development and demand for renewable energy.”

**Aside from being big in green energy usage, Intel has made a name for itself in the hugely popular world of e-sports**

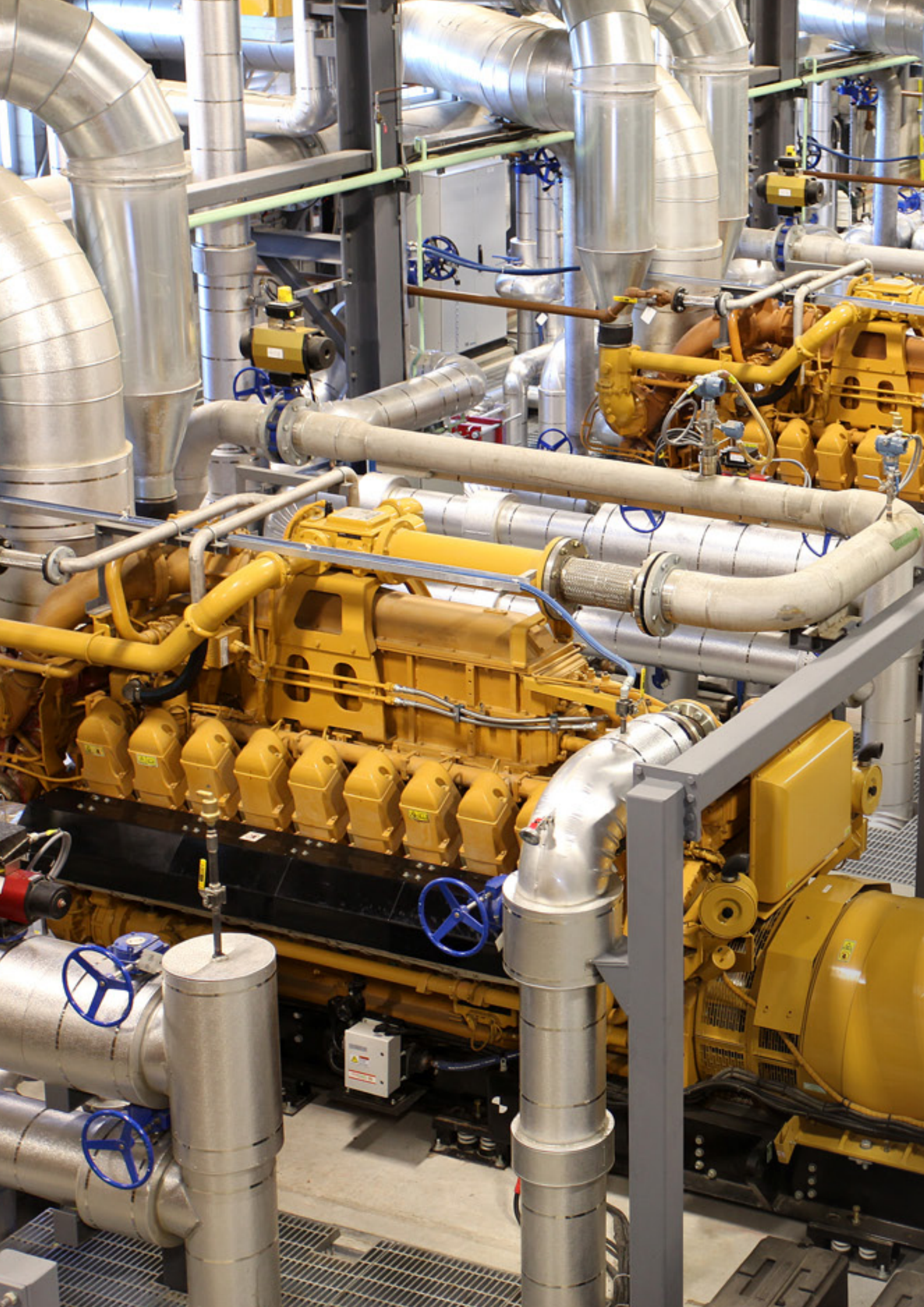




# intel® EXTREME MASTERS











# COGEN Europe

Promoting CHP as a major  
energy source in Europe

Written by Abigail Phillips   Produced by Richard Thomas





*'As an association  
COGEN Europe  
provides  
networking  
opportunities  
for its members  
and encourages  
industry decision-  
makers to come  
to a consensus  
behind closed  
doors'*

COGEN Europe is the European Association for the Promotion of Cogeneration. Its principal goal is to work towards the wider use of cogeneration in Europe for a sustainable energy future. Cogeneration or Combined Heat and Power (CHP) is the most efficient way to deliver heating, cooling and electricity.

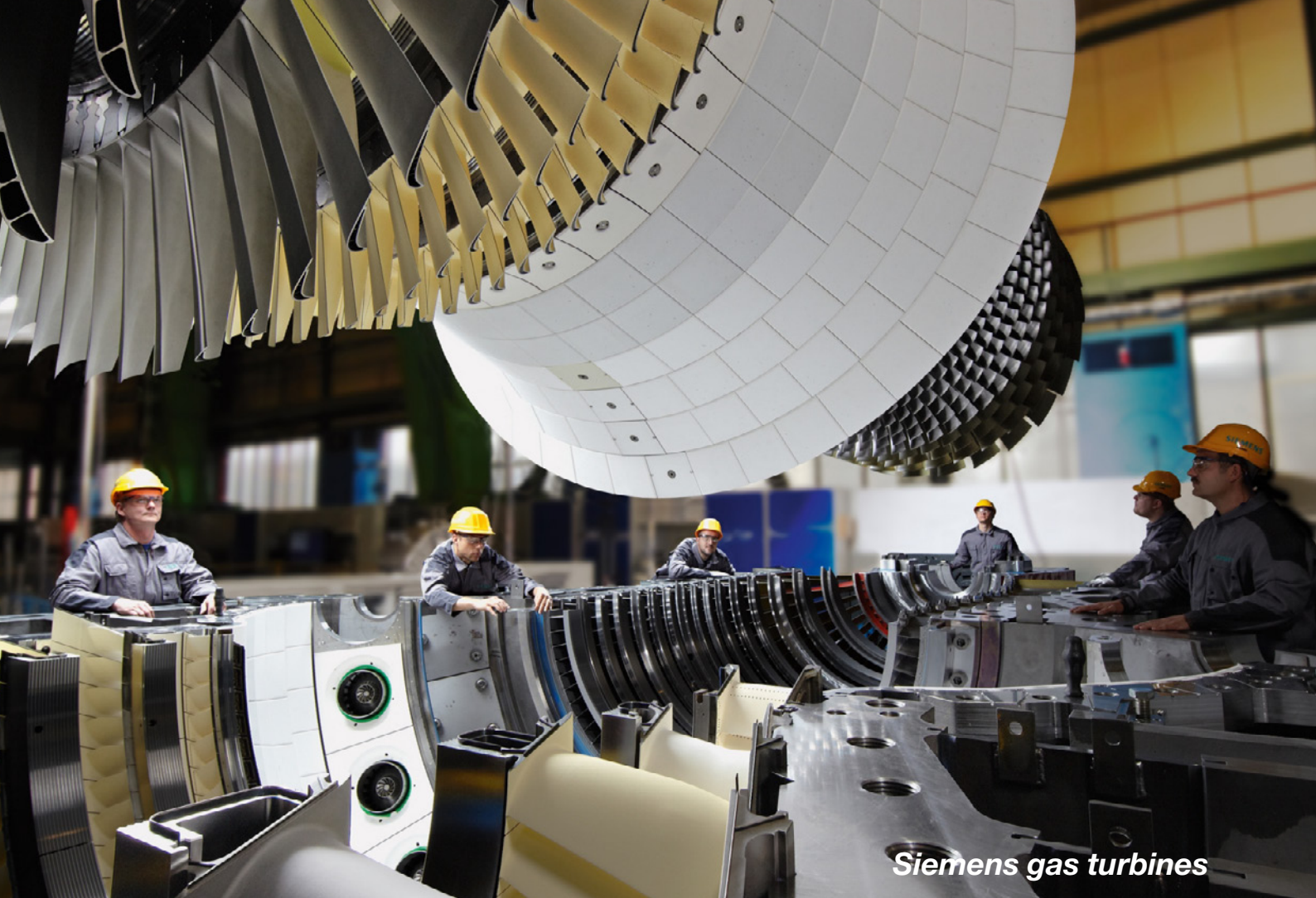
It is based on the simultaneous production of electricity and thermal energy, both of which are used. The central and most fundamental principle of cogeneration is that, in order to maximise the many benefits that arise from it, systems should be based on the heat demand of the application.

COGEN Europe promotes the widespread development of cogeneration in Europe and worldwide. To achieve this goal, COGEN Europe works at the EU level and with member states to develop sustainable energy policies and remove unnecessary barriers to implementation.

COGEN Europe is involved in a wide range of functions such as representing the interests of its members and of the cogeneration sector as a whole, organising the COGEN Europe Annual Conference (Europe's largest cogeneration event in the annual calendar), participating in European projects, coordinating internal expert Working Groups and producing COGEN Europe publications.

The COGEN Europe network covers the whole of the European Union, Central and Eastern Europe, and also includes Japan, Australia and the United States. COGEN Europe's status is that





of a Belgian non-for-profit organisation.

As an association COGEN Europe provides networking opportunities for its members and encourages industry decision-makers to come to a consensus behind closed doors. It provides a platform for industry leaders to debate and consider their collective position on issues raised by EU policy. Solidarity is essential and COGEN Europe helps to facilitate this.

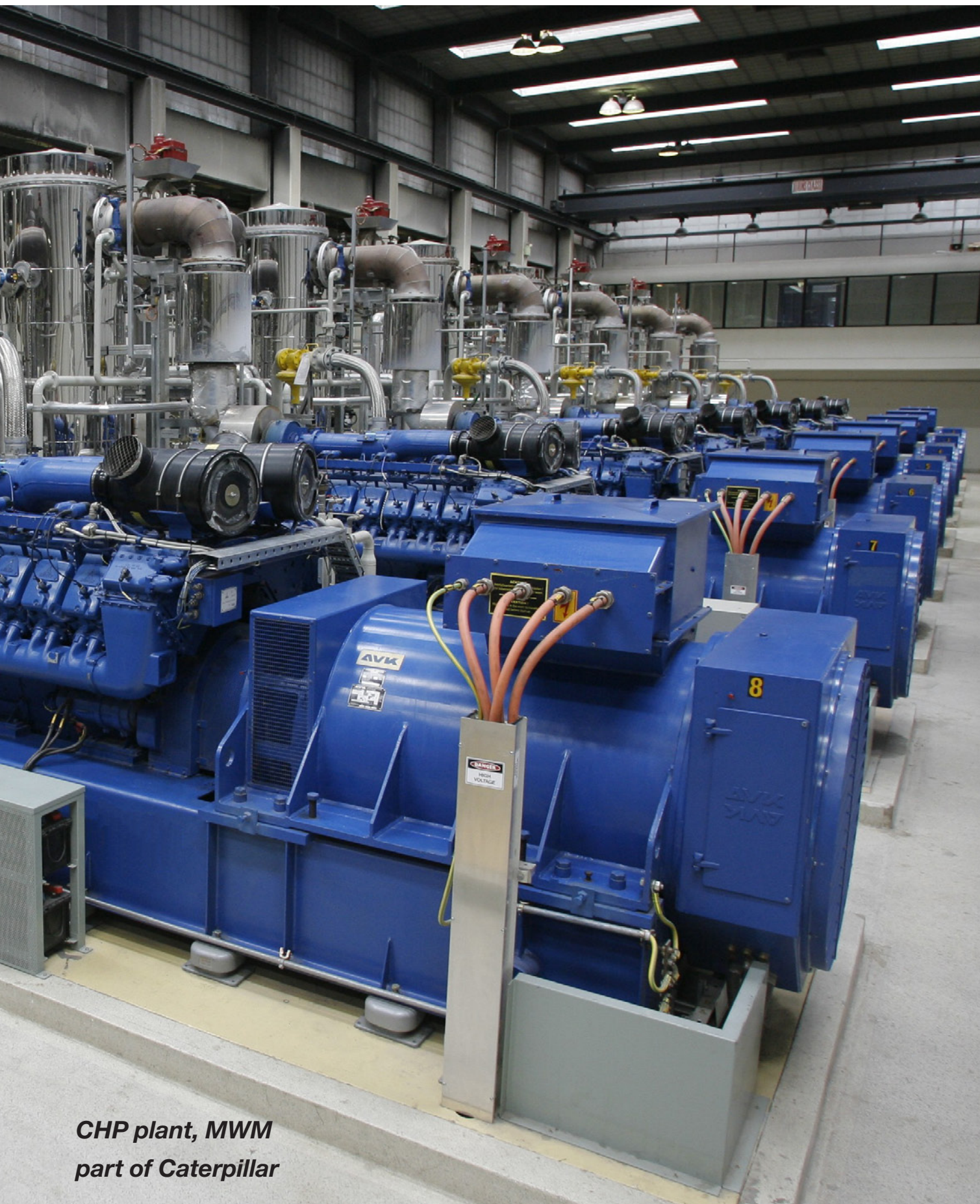
### **Interview with Fiona Riddoch, Managing Director**

“At the moment we are focusing very much on the implementation of the Energy Efficiency Directive (EED), which is Europe’s new legislation explicitly targeting the CHP sector. Otherwise

*“We must make use of all of our resources to continue to support and grow the EU economy”*

*– Dr Fiona Riddoch*





**CHP plant, MWM  
part of Caterpillar**



we are participating in discussions on the EU's 2030 energy and climate policies framework – we are supporting the EU in looking at how energy efficiency can contribute to relieving concerns of security of supply,” says Dr Fiona Riddoch, Managing Director.

“Our business is energy efficiency. We are constantly trying to improve the efficiency of products and are always innovating the next generation of CHP. We are always aware of the wider environmental issues of combustion and other emissions and we take full responsibility to work within the EU regulations on emissions of all kinds,” says Riddoch.

### **“Europe is really the centre of excellence for CHP globally”**

“We have major manufacturers including Rolls Royce and Centrax in the UK, Siemens in Germany and GE in several countries, to name just a few. There are many new companies emerging too, all building around the turbine and engine industrial inheritance of Europe. The major CHP economy in the world is in Europe,” says Riddoch.

“The Netherlands is a prime example, as is Denmark, which is a large district heating base. Denmark is exporting its expertise globally so we need to innovate this technology more successfully than anyone else. There is big demand globally, for example in China and Russia, as well as India, with expertise coming

## **Key Personnel**



### **Fiona Riddoch**

Managing Director

Fiona gained a PhD in Physics from the University of St. Andrews, writing a thesis on photovoltaics, and holds an MBA from Edinburgh University. She has worked in a range of engineering and management roles involving sectors from consumer electronics to wind-turbine components and building-system controls. A large part of her working career was spent with Honeywell Controls Ltd moving from manufacturing to marketing, and business management, in Scotland, Germany and around the world. Fiona pursued an interest in business development and launching new technologies, to work with a number of start-up companies in Scotland in both the technology and energy sectors, before joining COGEN Europe in November 2007 as Managing Director.



*Siemens gas turbines*

*“Energy efficiency supports all of Europe’s goals – energy, environment and security of supply”*

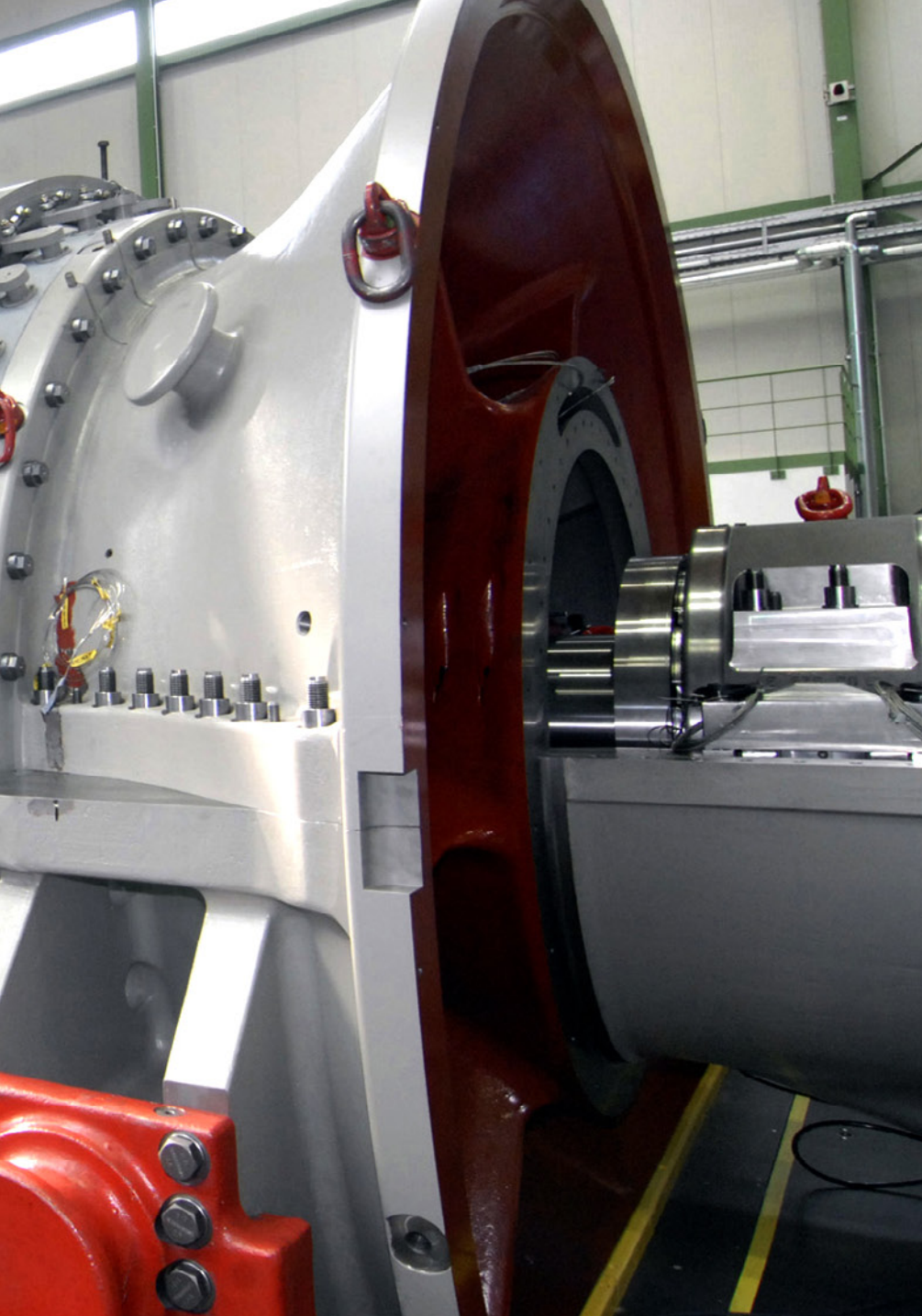
*– Dr Fiona Riddoch*

from top European companies and our supply chains.

“We are determined to promote and defend our engineering and would very much like to see the EU being successful in growing the CHP industry to its full potential because this can only lead to stronger exports of that technology. The world needs electricity and energy.

“CHP accounts for 11 percent of electricity and 15 percent of heat in Europe. It is an asset





## Association Information

### ASSOCIATION TYPE

Energy

### LOCATION

Brussels, Belgium

### FOUNDED

1993

### KEY PEOPLE:

Fiona Riddoch,  
Managing Director

### NO. OF MEMBERS

70 plus

to the EU economy. According to Riddoch, it is vital that Europe becomes more efficient, not only for climate change reasons but because the continent is not hugely resource rich. “We must make use of all of our resources to continue to support and grow the EU economy. Energy efficiency supports all of Europe’s goals – energy, environment and security of supply - and CHP has a very exciting role to play in that,” she concludes. ■







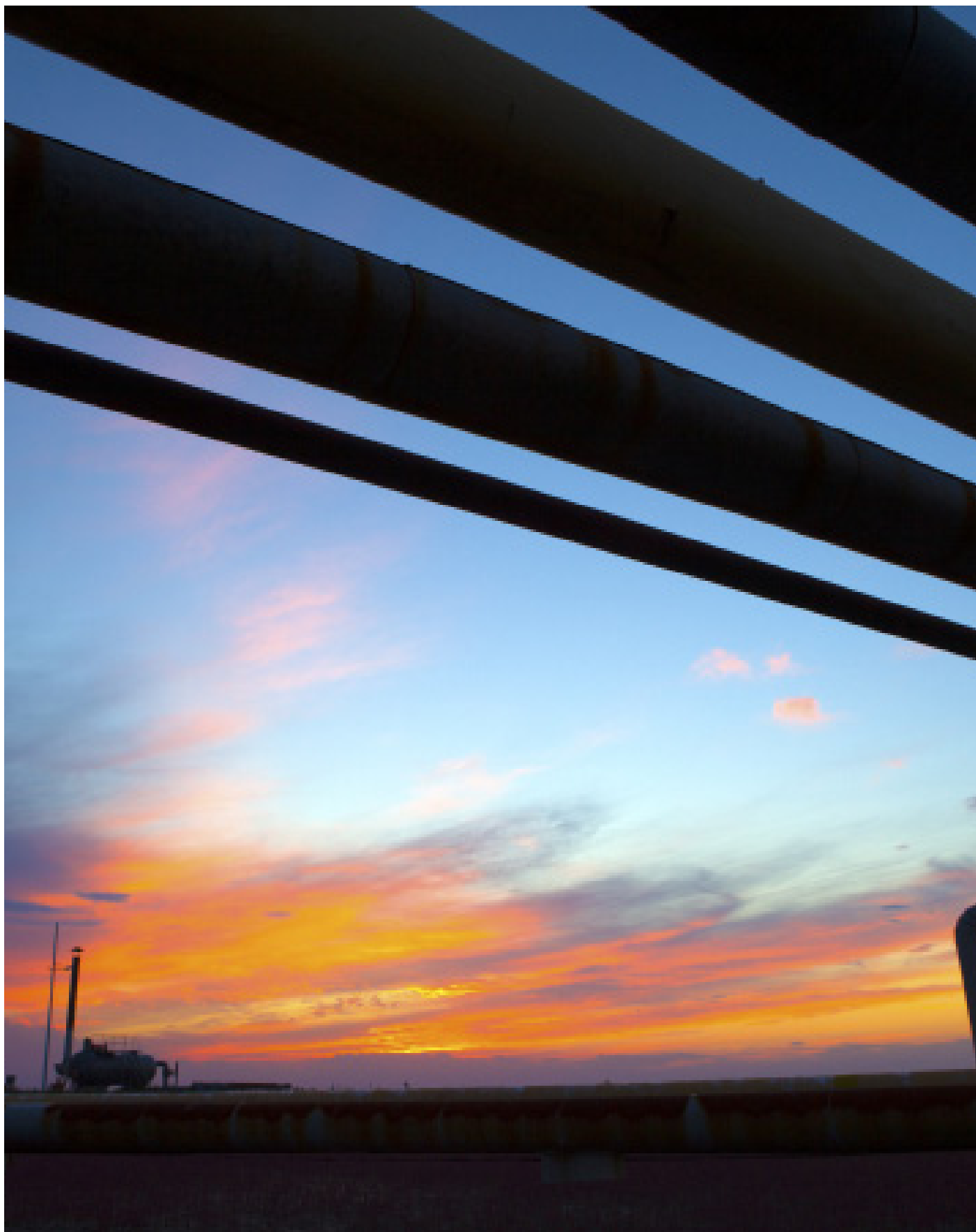
A silhouette of industrial equipment, including a large handwheel and a valve, against a blue sky background.

# Eagle Chief Midstream

Eagle Chief Midstream:  
A Smart Acquisition

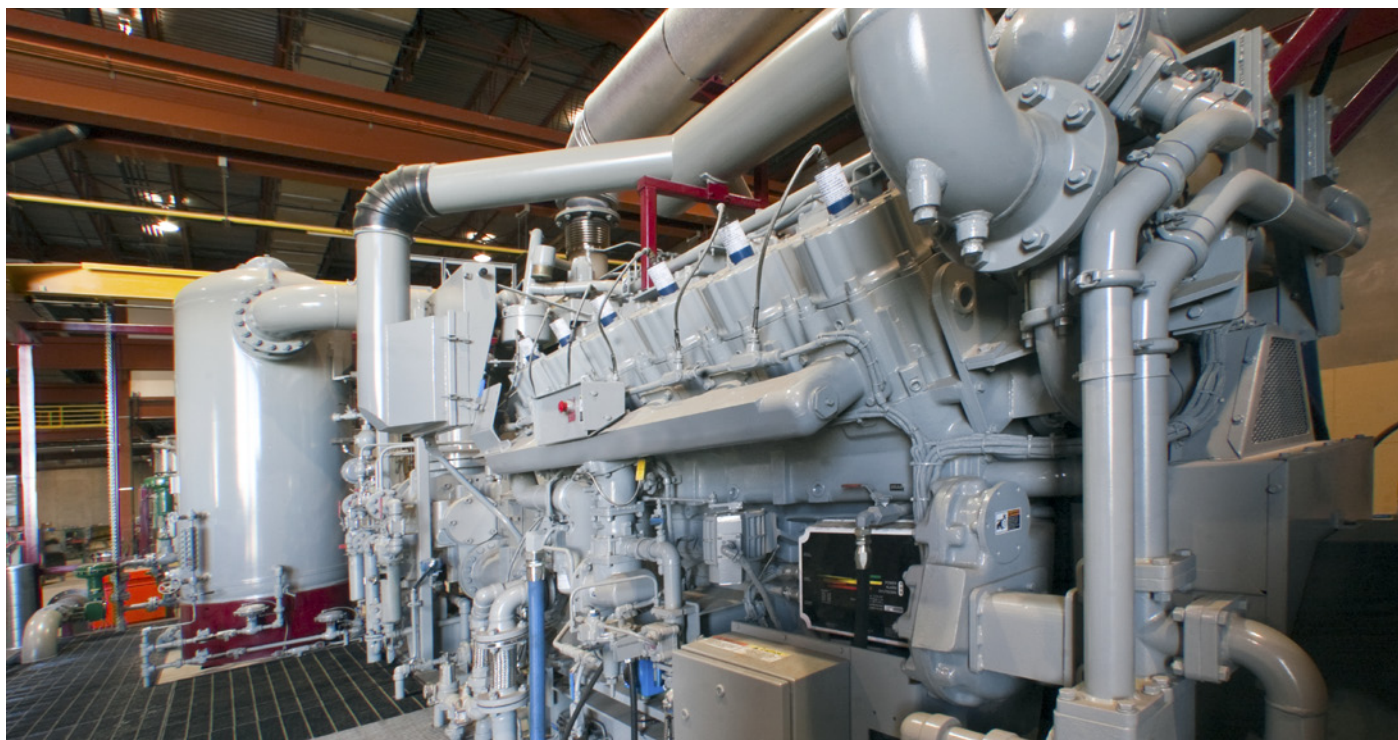
*The 600-mile stretch of pipeline is a step forward for  
Caballo Energy.*

**Written by: Kevin Smead   Produced by: Jason Wright**



*Natural Gas Pipeline*





### *Natural Gas Compressor Station*

**I**n 2011, natural gas and mid-stream services company Caballo Energy acquired Eagle Chief Midstream, who is the owner of more than 600 miles of natural gas pipelines, compression and processing assets in northwestern Oklahoma. Since then, there has been several major additions to the Eagle Chief system and it continues to grow today.

Headquartered in Tulsa, Oklahoma, Caballo Energy was formed to acquire, develop and manage natural gas gathering, compression, treating, processing, and marketing assets such as Eagle

Chief. The members of Caballo's senior management team have a combined 100 years of experience in natural gas gathering and processing, allowing them to make intelligent purchases, such as Eagle Chief.

Connected to more than 370 wells and serving 25 producers, The Eagle Chief assets are strategically located at the intersection of the liquids-rich Mississippi Lime and Cana Woodford Shale plays.

"The Mississippi Lime and Cana Woodford Shale are two of the most exciting plays in the country," Dennis Jaggi, one of EnCap Flatrock Midstream's three managing



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partners and a member of Caballo Energy's board of managers, said. "We're seeing a surge in drilling activity in northwestern Oklahoma in the Mississippi Lime formation. This is a great acquisition in an underserved region with very strong demand for gathering, compression and processing services. Acquisition of Eagle Chief will enable Caballo Energy to grow as demand accelerates. We look forward to working with producers to improve their economics by providing effective service and multiple options for moving gas and crude to market."

The Carmen Gas Processing Plant in Alfalfa County, Oklahoma is designed to help provide this better service to Caballo's customers. Coming online in 2013, the plant has a processing capacity of 60 million cubic feet of natural gas per day (MMcf/d) and brings the total processing capacity in the region to around 100 MMcf/d.

"Bringing the Carmen plant online is an exciting step forward as we continue to expand the Eagle Chief system," Caballo President and CEO Bob Firth said.

"Horizontal drilling has brought a boom to northwestern Oklahoma. There is a great deal of drilling activity focused on the liquids-rich gas found in the Mississippi Lime and Cana Woodford shale formations. We believe the region has significant potential for future growth, particularly to the east and into Kansas. We are excited to be part of this growth and provide the processing capabilities our customers need."

Other assets include the Magic Circle Oil and water Gathering System located in southern Woods and Alfalfa counties. This system includes a crude oil gathering system and a saltwater disposal system, as well as commercial disposal well. It also has current on-system wells for natural gas, crude and saltwater which target the Mississippi Lime and Cana-Woodford Shale formations, as well as the Anadarko, Chester, Hunton and Manning formations.

Of course, efficient and smooth operations are part of Caballo's continued success with Eagle Chief. Work is completed on time and on budget, utilizing the large group



of suppliers and service providers to their advantage. The company believes in building plants the right way the first time so they're easy to maintain and have a feasible operating cost.

Currently, Eagle Chief is laying an 8 inch line to connect additional gas from the north end of their system. This line will increase the flexibility of the pipeline and plants, allowing Eagle Chief an avenue for future





## Company Information

### INDUSTRY

Sector

### HEADQUARTERS

Tulsa, Oklahoma

### FOUNDED

2011

### EMPLOYEES

600

growth—something the company is always focused on.

Caballo's efforts are currently focused in Texas, Oklahoma, and Kansas, but it looking to find opportunities in emerging shale plays.



# **Delta Energy Solutions** Leading The Industry With Innovation

*Delta Energy Systems is driving technology to become the most innovative and a solutions provider for its customers.*

**Written by: Laura Close   Produced by: Wayne Masciotro**





# ions:

# Energy Solutions

*more energy efficient*



### *Delta EV Charging*

**D**elta Energy Systems is not just a global leader in power and thermal management solutions—it is *the* leader. The company, with facilities throughout Asia Pacific, the US and Europe, has been the recipient of several global awards in categories such as business, technology and corporate social responsibility. Since 2010, Delta has received

over 40 international design awards including the iF, Reddot, CES Innovation, Computex Best Choice and Taiwan Excellence awards. And 2012 marked the second consecutive year the thermal management solutions company was chosen for two prestigious Dow Jones Sustainability Indexes—the DJSI World Index and the DJSI Asia/Pacific Index.





### *Delta MCIS Products*

The company was founded by Bruce C.H. Cheng in 1971, and has recently transformed from a product provider toward a solution provider mission. Its expertise includes power electronics, energy management and smart green life. Delta Energy Systems puts a lot of their man power into research and development, and is devoted to innovation and developing

new products and technologies that focus specifically on high efficiency and energy savings.

Delta Energy Systems' mission statement "To provide innovative, clean and energy-efficient solutions for a better tomorrow," and brand promise "Smarter. Greener. Together." combined showcase a company dedicated to key environmental issues



### *Delta LED lighting*

and the development and broad application of smart, energy-efficient solutions.


#### **Continuous Improvement**

Being a leader in the power and thermal management solutions industry means that Delta Energy Systems is constantly striving to improve its products and lessen the company's impact on the planet.

With 54 research and development sites globally and 7,500 engineers who continue adding to the company's close to 5,000 registered patents, Delta Energy Systems invests 5 to 6 percent of the group's annual sales revenue to research and development.

At the Delta Power Electronics Laboratory in North Carolina, US, researchers and engineers





*“Delta Energy Systems is devoted to innovation and developing new products and technologies that focus specifically on high efficiency and energy savings.”*

develop high-efficiency and high-density power conversion products. Another lab in the same locale, the Delta Networks R&D Laboratory, develops networking products. Soest, Germany’s research and development team, channels its energy into developing key power supply products and technologies for applications like hybrid vehicles, super computers,

high-end server storage, telecommunications, data centres and wind power converters.

A majority of Delta Energy Systems’ research and development locations are in China: 23 in total. The Delta Power Electronics Center (DPEC) in Pudong, Shanghai develops energy-saving technologies. There are also CNAS (China

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National Accreditation Service for Conformity Assessment) laboratories in Shanghai, Guangdong and Jiangsu, and post-Ph.D. innovation stations in the research and development centres in Shanghai and Jiangsu.

The Asia Pacific has been especially productive and successful in regards to research and development, garnering many of Delta Energy Systems' recent awards. In 2008 and again in 2012, the company won the Taiwan

National Industry Innovation Award, and has been a repeat winner of the Thailand Prime Minister's Industry Award (in 1995, 2010, 2011 and 2012).

The Asia Pacific has thriving research and development programmes in universities, which cultivate future talent for the company and the industry. Taiwan's National Cheng-Kung University, as well as its National Central University and National Taiwan University support Delta



Energy Systems programmes. US universities like MIT, Virginia Polytech and Case Western Reserve University have similar opportunities for interested students.

Technology

Delta Energy Systems’ drive for efficiency means the company is on the cutting edge of technology. This push on technology is allowing Delta Energy Systems to rapidly and successfully expand into several businesses related to power management, including power systems for data centres, cooling fans and thermal solutions, industrial automation systems, power trains and key components for EVs/HEVs, high-end projection systems, LED lighting and renewable energy.

Another accomplishment to add to its world leader title, Delta successfully developed the world’s first titanium-grade server power supply with a high-efficiency rating of 96 percent. Other technological contributions in recent years include the development and research of medium voltage drives, converters for wind turbines and green buildings. With high-density and high-efficiency products the goal, Delta Energy Systems continues to lead the global industry, pushing the boundaries of technology and making their business practices as green as possible.

Company Information

INDUSTRY

Energy

HEADQUARTERS

Tambon Prakasa,  
Thailand

FOUNDED

1971

EMPLOYEES

85

REVENUE

\$150 Million

PRODUCTS/  
SERVICES

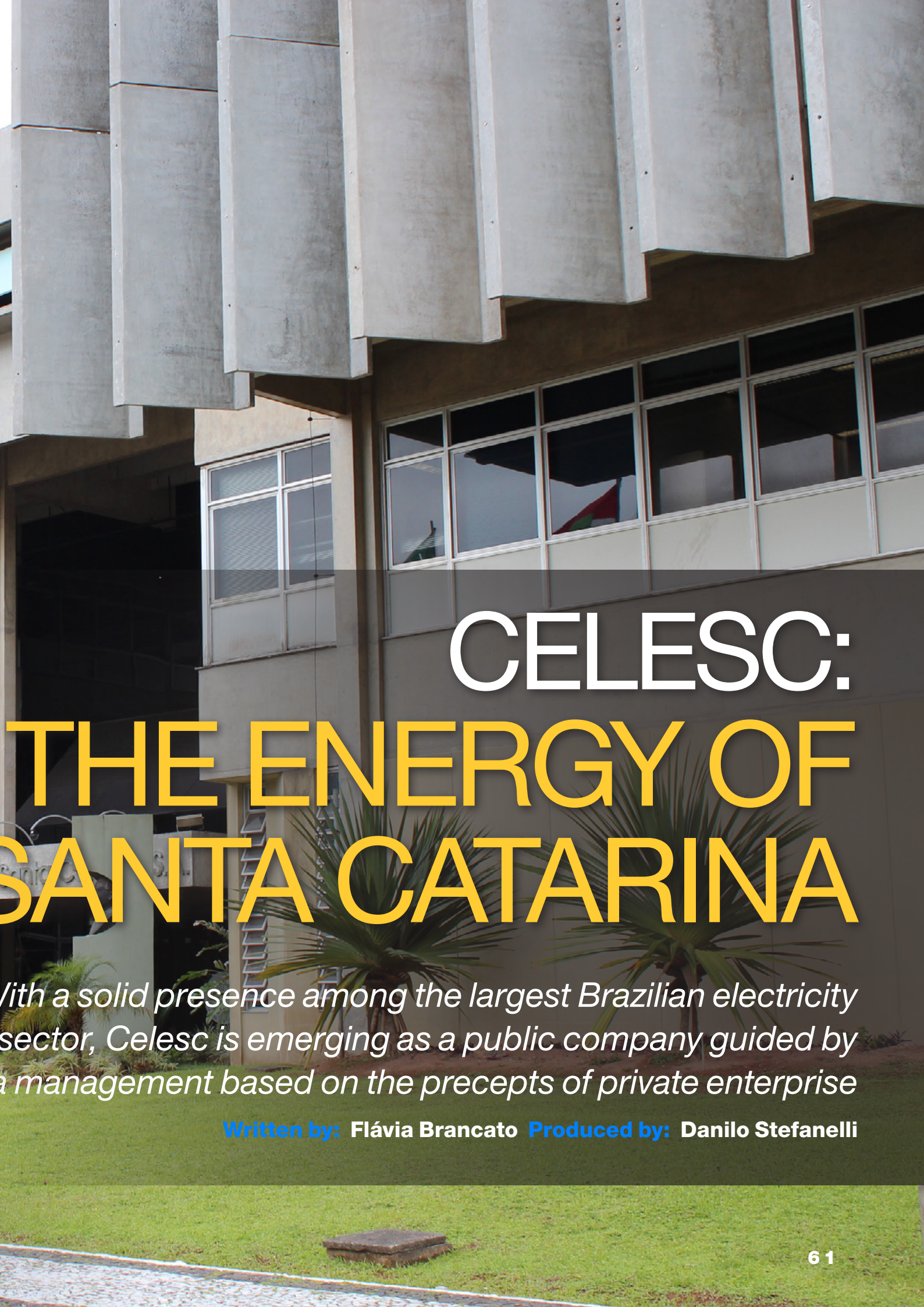
With research and development, sales and manufacturing locations all over the world, Delta Energy Systems has become a global leader in the power and thermal management solutions industry. The company develops, manufactures and markets innovative supplies for medical applications, office automation, the computer industry, telecommunication, industrial applications and renewable energy. Delta Group was found in 1971 by Bruce C.H. Cheng, and has grown to have locations in Taiwan, China, Thailand, Mexico, India, Europe and the US.



Celesc





A photograph of a modern building facade. The upper part features large, light-colored concrete panels that protrude from the building. Below these are several windows with white frames. The lower part of the image shows a green lawn and some palm trees. The text 'CELESC: THE ENERGY OF SANTA CATARINA' is overlaid on the image. 'CELESC:' is in white, and 'THE ENERGY OF SANTA CATARINA' is in yellow.

# CELESC: THE ENERGY OF SANTA CATARINA

*With a solid presence among the largest Brazilian electricity sector, Celesc is emerging as a public company guided by a management based on the precepts of private enterprise*

**Written by:** Flávia Brancato **Produced by:** Danilo Stefanelli



**W**ith 60 years of history and many achievements, Centrais Elétricas de Santa Catarina S.A – Celesc, is recognized for its expertise and excellence in business management in the energy sector. Considered one of the largest companies in the Brazilian electricity sector, the company began its expansion cycle working originally as a state power system planning agency, to assume the role of holding and start to gradually incorporate the heritage of old regional companies.

With a high level of efficiency, the company has built a solid electrical system, energy-integrating all sectors of its concession area. In the 1980s, Celesc reached the milestone of half a million customers and already has emerged as one of the best companies electricity distributors in the country.

At the same time, the company was also structuring the high voltage







system connected to the National Interconnected System, conquered in the early 2000s, providing highly reliable energy supply across the state of Santa Catarina. Currently, the Group is preparing for new challenges by investing in partnership with the private sector to work in new business and in actions aimed at strategically maximum operational efficiency, providing even better service to their customers and more attractive to investors.

## **INTEGRALS SUBSIDIARIES**

Shortly after celebrating its 50th anniversary, given the model advocated by the Brazilian electricity sector legislation, Celesc was structured as a holding company operating through two more wholly-owned subsidiaries: Celesc Generation S.A. and Celesc Distribution S.A.

With the mission to act in a diversified manner in the energy market, with profitability, efficiency, quality and environmental responsibility, the Company also holds equity interests in other companies in the electricity sector and the infrastructure area, in addition to the equity control of

The background of the top half of the page is a complex, abstract composition. It features a dark, textured blue and black background with a large, glowing orange and red sphere in the center. Overlaid on this are various patterns of binary code (0s and 1s) in white, orange, and blue. Some of the binary code is arranged in a way that suggests a globe or a network. The overall effect is high-tech and digital.

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Sonda Utilities is a Sonda's division group dedicated to water, gas and energy generation, transmission and distribution companies which has great expertise in business processes of electric power companies, a sector in which it holds the absolute leader in providing business management solutions.

In its portfolio, the company has corporate solutions to the utilities segment, covering commercial and technical management, mobility solutions for field service, electronic and borders measurement and management of buying and selling energy contracts.

The company, elected for three consecutive years as the most efficient service company among the largest in its fields, which is present in 25% of Brazilian energy distributors and over 40% of the country, attending more than 16 million consumers.

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SCGAS (Companhia de Gás de Santa Catarina) - second largest piped gas distributor in number of municipalities served in Brazil and responsible for the distribution of piped natural gas in Santa Catarina.

## **CELESC GENERATION**

Created in 2006 from the unbundling process of distribution, transmission and generation of electricity became responsible for the operation, maintenance and expansion of the Company's generating facilities.

Guided by the strategic positioning to increase the capacity of its own generation, the company began to invest in repowering of existing plants and partnerships for implementing projects aimed at the construction of new projects and the diversification of energy sources, especially in the areas of solar energy and wind.

## **CELESC DISTRIBUTION**

In charge of the electricity distribution services, Celesc has consolidated presence among the best of the country's electricity sector, holds the



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sixth position in the ranking of higher revenues from supply, the seventh in energy supplied volume and 10th in number of consumer units. Its market share in electricity distribution corresponds to 4.7 percent of the country's energy consumption and its market is highly dynamic and diverse.

With grant of 92 percent of the state, operates in 257 counties of Santa Catarina, beyond the town of Rio Negro, in the state of Paraná, serving 2.7 million consumer units (Dec / 2014). The subsidiary also operates in the energy supply to meet four concessionaires and 11 permit holders, responsible for the care of the other 31 counties of Santa Catarina.

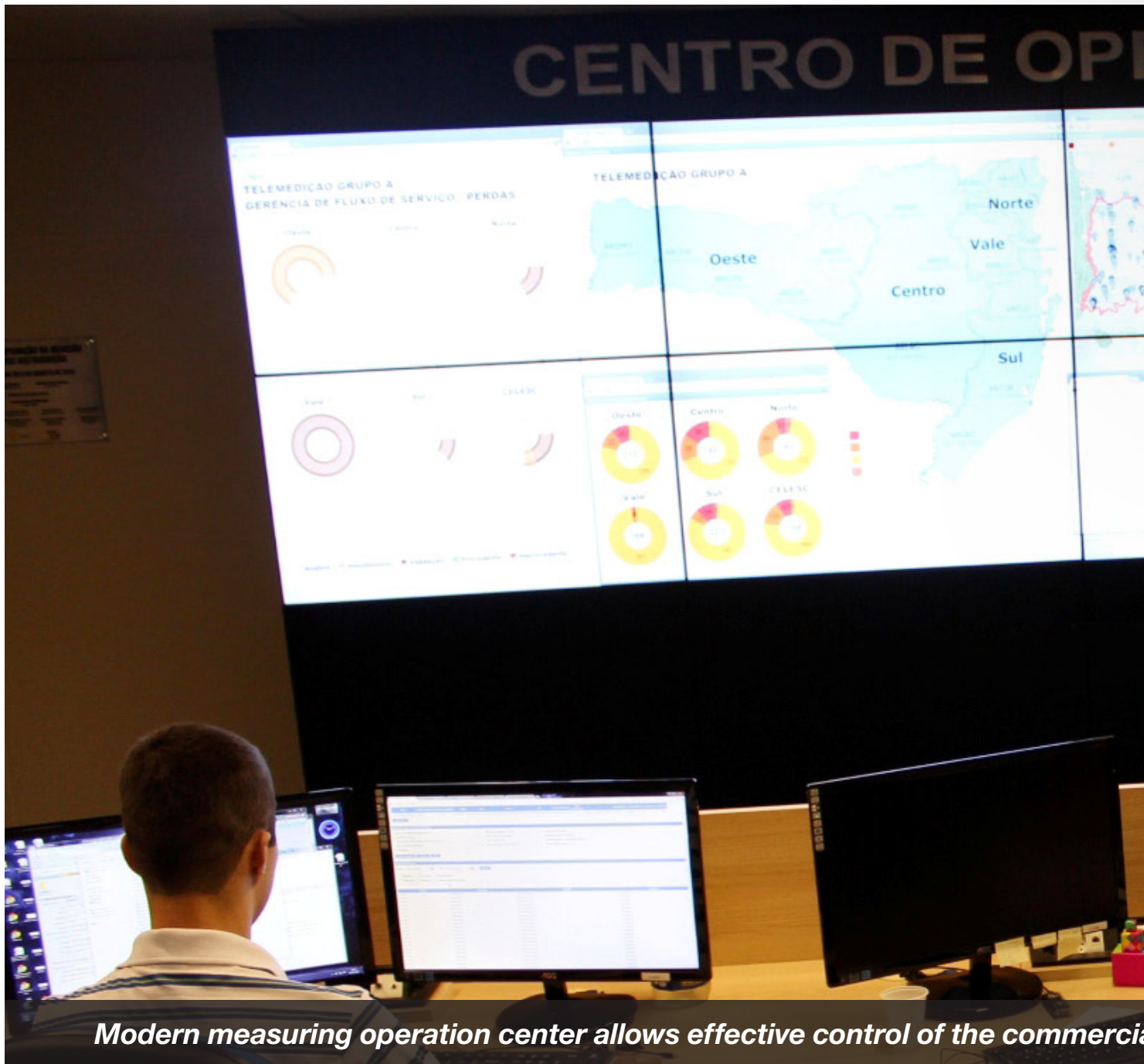
## BYLAWS CHANGES

In an extremely complex and challenging market, based on a diagnosis completed in 2011, Celesc made a transformation, based on major statutory changes. The strands refer mainly to good corporate governance



Credit - Edson Junkes

*Training Plan aims improvement and maximum efficiency*



*Modern measuring operation center allows effective control of the commercial*

and a complete master plan, allowing the company to see the long-term actions.

The scale of the changes brought new perspectives where some relevant logics were observed. The most important, that the company should not be only operating in power distribution - responsible for 97 percent of the group sales - but open its affairs to generation, transmission and new business.





*al losses volume, one of the lowest rates in the industry*

Through an operating efficiency plan, were developed 125 actions on multiple fronts of the company, which has already shown results. Not only economic and financial, which are fundamental, but also operational results.

The positive results did not take long to appear. The Prêmio Abradee 2013, a award that compares the results and indicators of 63 distributors in the country, Celesc established itself as the third distributor in the



***Expansion of existing plants - return to power generation***



***Training Plan aims continuous improvement and maximum efficiency***

country that has evolved, highlighting as the best distributor indicators in Brazil in the use of capital and third-party capital; the second best in operating losses and the fourth best in default.

## **SOCIAL AND ENVIRONMENTAL RESPONSIBILITY**

The Social Responsibility actions of the company are also based on their values, acting ethically, transparent and accountable to its internal and external audiences.

The main idea of Celesc's Social Responsibility Program is the Triple Bottom Line – TBL, which requires strategic planning in defining goals and corporate actions, guided in three dimensions: economic, social and environmental.

The Company invests in continuous improvement providing services, ensuring the economic and social development in its concession area, in social initiatives associated with projects like the Energy Efficiency Program, through actions that encourage volunteering and strengthening citizenship, the promotion of environmental responsibility and public policies that benefit society as a whole.


## **INDUSTRY RECOGNITION**

The effort of Celesc in approaching the individual investor, providing information on the capital market and guidelines for admission to the Stock Exchange, earned the Capital Aberto award in 2011.






*Investments in eolic energy*



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This year, the company earned the 1st place in the Holding national category for the quality of presentation on its financial statements in 2013, awarded by the Brazilian Association Abracone. The award analyzes the annual reports of the industry and rewards those whose financial statements stands out in the categories content, grammar, layout, preparation of financial statements, the management report, social report and accompanying notes.

The Santa Catarina concessionaire has a history of awards in the IASC - Customer Satisfaction Index Aneel when they won, in 2002, 2007 and 2009, first place as best distributor in the South, in the category with over 400 thousand consumer units.

In November, Celesc Distribution won second place in the 2014 edition of IASC Award, as well as being voted the second best distributor in





to power generation

the South, in the same category. With a score above the national average index, the index of satisfaction with the services provided by Celesc was 74.58, which increased by over 20 percent compared to 2013.

In the ranking of the Best and Biggest companies released by Exame Magazine of 2014, with data from the 2013 balance sheets of the 1000 largest companies in Brazil, Celesc reached the 99th position in sales, with global revenues of US\$ 4.9 billion - which cast her as the 11th State in Gross Revenue. The previous year was 103rd in sales and 14th State-owned in Gross Revenue.

## Company Information

### INDUSTRY

Energy

### HEADQUARTERS

Florianópolis, Santa Catarina, Brazil

### ESTABLISHED

1955

### EMPLOYEES

3.262 (Sept/2014)

### PRODUCTS / SERVICES

Generation, transmission and distribution of electricity, focusing on business diversification associated with the energy sector

### ANNUAL REVENUE

US\$ 3 Billion (2013)





# Whitby Hydro Energy Services Corporation

After More than 110 Years,  
Whitby Hydro Remains Strong

*The more than century-old company has built a solid core of operations while constantly adapting to meet changing needs.*

**Written by: Kevin Smead   Produced by: Michael Magno**






ong  
re of  
needs.







**Whitby Hydro**

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	<b>Electric Corporation</b> distributes electricity to homes and businesses in Whitby, Brooklin, Ashburn and Myrtle.		<b>Energy Services Corporation</b> provides a broad range of competitive services and entrepreneurial business solutions.	
↓		<b>Promoting a Culture of Conservation</b>		<b>Power Outage Information</b>

**A**t more than 110 years old, one might think of Whitby Hydro as “old school.” That, however, couldn’t be further from the truth. While the company sticks to its roots and continues to do what it’s always done best, Whitby Hydro is always looking to the future and changing with the trends of the market.

## Overview

Whitby Hydro is a local distribution company with two operating divisions—a regulated division, which is more of a traditional utility model, and an unregulated side, which is able to provide services

to outside its franchise area. Vice President of Engineering and Business Kevin Whitehead says that the symbiosis of these two divisions give Whitby Hydro its competitive advantage.

“We’re not only a design-builder,” he explained. “We’re also an operator. We combine our operations and design experience.”

The company’s long term success, as Whitehead pointed out, is also somewhat tied with the growth of the region it services.

“We’re in a very economically viable portion of Ontario,” he noted. “There’s been good, stable industry



here and we've experienced load growth with population growth."

Still, remaining successful over such a lengthy period of time requires smart adaptation and constant innovation—abilities Whitby Hydro has consistently demonstrated in its operations.

## Operations

One area of operations the company is currently growing in is the designing and building of substations for utilities and developers outside of its franchise area.

"We have an innovative design which is a low-profile, modular design so it's completely dead front," Whitehead explained. "This means you cannot get electrocuted if you step into or touch the equipment."

In addition, Whitby Hydro recently implemented an internet-based SCADA (supervisory control and data acquisition) system, which afforded them a number of new improvements.

"We had a non-RTU based SCADA system in the past, but it was difficult to support," Whitehead said.

Whitehead explained that in order

to support the system, the company had to build a laboratory in which all changes needed to be made. They would then have to implement the changes made in the lab in the shop.

"There was only one individual who did this and they ended up retiring, leaving us abandoned," he continued. "So, we went to this internet based solution because (a) it was cost effective—around one-tenth the cost of our legacy system—and (b) it was easy for us to implement and support ourselves."

While it's important for Whitby to be self-supporting, they also work with others to get the job done.

"For our projects, we have a strong network of support consultants and suppliers," Whitehead said. Still, much of Whitby Hydro's work is done internally, requiring a lean, talented staff.

"When we find the right individual," Whitehead said, "we try to make the work interesting and provide a healthy environment for them to grow in."

The environment and culture with which the company operates is not only attractive to employees, but

other partners as well.

“First of all, being a utility, we always pay our bills on time,” Whitehead noted. “Secondly, the suppliers—say, GE for example—like to deal with us because if they can launch a product in our franchise area, it gives credibility to the product when the other utilities are looking at it.”

## A Transitioning Marketplace

With this solid foundation in place, Whitby Hydro is able to comfortably

look toward the future.

“The trend we’re seeing right now is renewable generation penetration and smart grid initiatives,” Whitehead said. “Currently, we’re looking at implementing storage, not only in our franchise territory, but outside of our territory as well.”

In order to ensure these improvements go smoothly, Whitby Hydro has a system in place.

“We always map out our processes and we’re always looking at those processes for ways to



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continuously improve them,” Whitehead said.

He explained how the drivers of this improvement could be either personnel or regulatory, though documentation is crucial to identifying needs.

“By virtue of having a map of what our process looks like,” he said, “we know where we can improve it to make it more efficient.”

These improvements are helping Whitby achieve its short and long term goals.

“In the short term, we’re trying to establish a presence in the market in terms of some initiatives such as energy storage and distributed generation,” Whitehead said. “In the longer term, we’re looking to turn over higher dividends to our shareholders.”

To achieve these goals, the company is adapting once more, just as it has for more than a century.

“The market is going toward microgrids,” Whitehead said. “Right now, we have centralized power plants. The market is shifting, driven by the penetration of renewable energy. With weather, snow storms and people losing power, they’re looking for more stand-alone capability. We’re looking at technologies such as micro turbines or fuel cells that might facilitate the off-grid connections.”

As the market transitions, one can rest assured that Whitby Hydro will remain a leader in the field.

## Company Information

### INDUSTRY

Utility

### HEADQUARTERS

Ontario, Canada

### FOUNDED

1903

### EMPLOYEES

70+

### REVENUE

\$80 million



**K-LINE**  
GROUP

# K-Line Group of Companies

## Two Trucks and a Vision

*Emerging from humble beginnings, K-Line has become one of Canada's premier high voltage service providers.*

**Written by: Kevin Smead    Produced by: Michael Magno**









**B**rothers Allan and Mark Kellett have been leading the K-Line Group, a high voltage utility service provider, for more than 25 years.

K-Line was founded by their father, Glenn, in 1967. Armed with years of experience at Ontario's Hydro One and a strategic eye for business, he sold one of his properties in order to purchase two trucks—both of which are still owned by the company today—and began running operations out of the basement at his Scarborough home.

Glenn saw an opportunity to provide high voltage services

at a time when utilities began outsourcing work. What began as K-Line Maintenance and Construction is now part of a larger group, which includes operations in several countries across the globe.

Still, it was Glenn's initial efforts that put the company on the path to where it is today.

"K-line didn't just fall out of the sky," Mark said, "but started with a person with a vision who came from Minden, Ontario."

### **A Family Culture**

While the company has certainly grown since its inception, it has



managed to maintain its family culture.

“We take pride in being a family business,” Allan said. “We have a family culture, which most companies don’t have.”

This has been especially helpful in attracting and retaining a workforce that wants to be part of a company such as K-Line. Since Allan and Mark took over the company 25 years ago, they’ve been seeing a lot of familiar faces.

“We have employees that have been with us for over 30 years,” Mark said. “Obviously people retire and you get new people coming up, but it’s not a revolving door here.”

Those who do join the company have had their high expectations met.

“We’ve heard so many times over the years when we get new employees, ‘We’ve heard about K-Line, their industry leading equipment and tooling, and the unique management style, so we’ve come here and it’s true,’” Mark said. “That’s just how it is.”

Beyond competitive salaries and full benefits even for non-union workers, Allan believes the attention paid to employees is important for retaining top talent.

“When we have our annual general meetings—which we have every year in every province and its one big thing our employees really like—Allan and I intermingle with all the employees,” Mark explained. “It’s not as though we just sit in the office. We go to see them throughout the year, including the holiday seasons, and they really like that.”

K-Line believes in investing in its employees, since they’re the company’s representatives in the field. According to both brothers, this has paid off for the company.

### **Safety as a Top Priority**

Another reason K-Line has seen such great success is its willingness to train its staff on always staying safe.

“We certainly take pride in our safety program,” Allan said. “Since the company’s inception, safety was always in the forefront, so we’ve taken that to the next level. We can honestly say that we’ve been raising the bar across the industry.”

To better implement policies and procedures for safety, K-Line has developed their own Integrated Management System, or IMS. It is designed with constant training in



### *Substation Promo*

mind, which is something K-Line does regularly.

“Literally everyone in our company is trained on our new policies at the beginning of each year,” Mark said. “We take pride in the training of our people. We invest a lot in that, which seems to pay us back exponentially.”

K-Line often times sends its employees to training courses and invests heavily in ensuring all

members of the team are up to speed on the current safety protocols. According to Allan, it’s something they take extremely seriously.

“The line of work that we’re in, you have to be safe,” he explained. “That’s always been the family philosophy so we promote this within our group. It starts from the top down. It’s about building that culture. We have quite a few





employees, and we can honestly say it's a culture that everyone buys into. That's huge. That flows into our alliance partners and the people that we align ourselves with—the CEOs, the shareholders. They're all protected. It's something you need to do as a business, but we take it to the next level and raise the bar. We're always at the forefront in the industry."

### **High Voltage, High Quality and High Performance**

Being at the forefront is something K-Line has embodied for many years now and is reflected in the company's slogan (above). At the turn of this century, the company changed its business strategy.

"Instead of chasing the work and doing all bid work, we went to more alliance-type work, which was



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unheard of in the past,” Allan explained. “This type of strategy was more predominant in manufacturing. In sense we have changed the market. Now, it’s come to the point where it’s all lining up for us.”

K-Line also works to stay on the pulse of the industry, following what the trends are for utilities and adapting the business to meet their needs. No matter the trend, K-Line’s philosophy remains the same.

“The biggest thing is to perform,” Mark said. “If you look at us, we’re not the lowest cost service provider and when you’re not the lowest price in town, you have to show value to your customers. That means getting the job done on time, on-budget, and with integrity.”

This honest style of doing business has garnered K-Line a lot of repeat business, allowing for relationships and alliances to build over time. For Mark, it’s pretty simple.

“If you go to a customer and say, ‘We’re going to do this,’ and you don’t do it, you won’t get asked back,” he said. “Well, we get asked back all the time.”

For a company that started with two trucks and a vision, it might seem surprising that K-Line has become the powerhouse it is today. But looking at the company’s history and the way it does business, it’s really no surprise at all.

Company Information

INDUSTRY  
Energy & Utilities

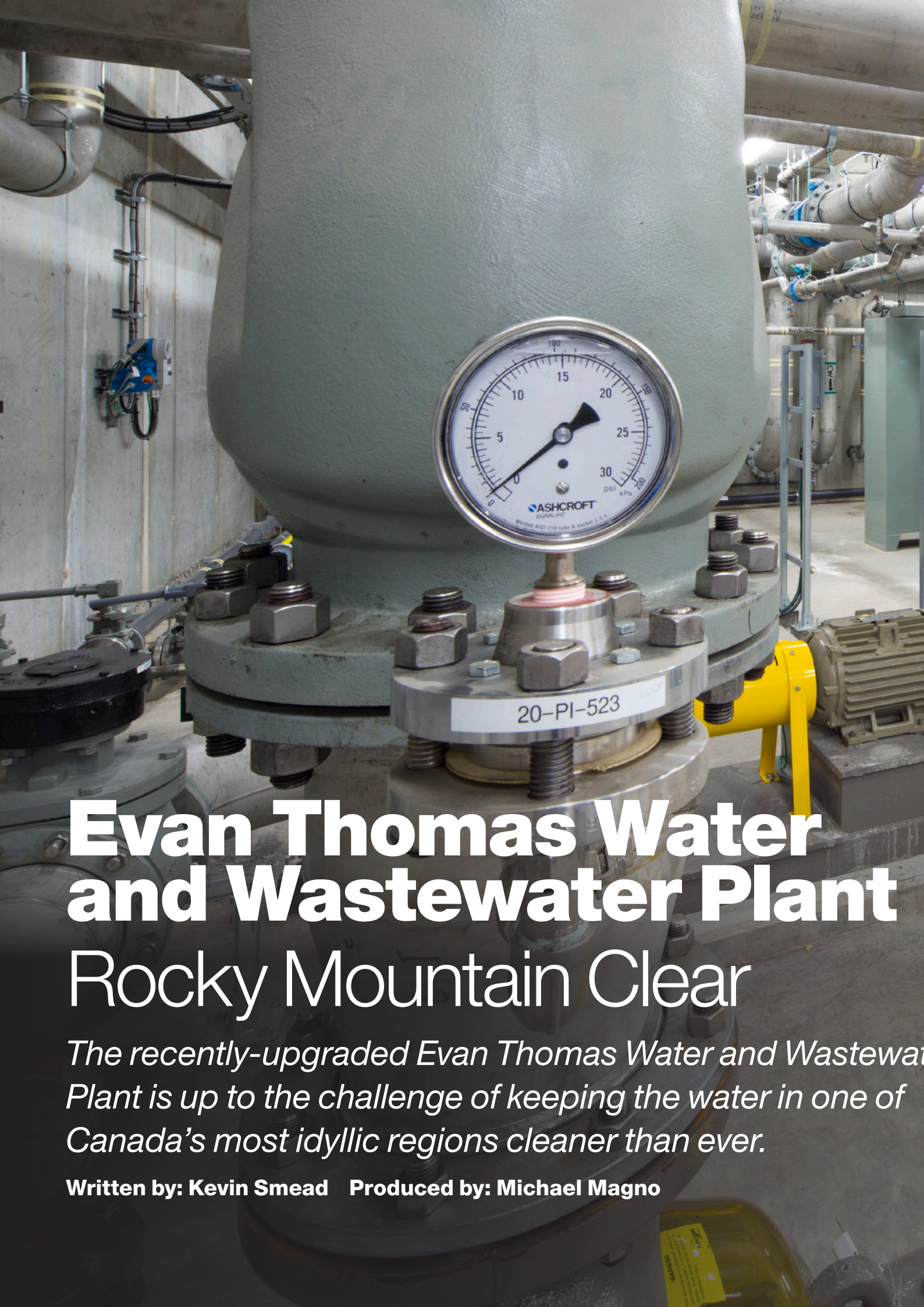
HEADQUARTERS  
Ontario, Canada

FOUNDED  
1967

EMPLOYEES  
500+

REVENUE  
\$80-100 million





# Evan Thomas Water and Wastewater Plant Rocky Mountain Clear

*The recently-upgraded Evan Thomas Water and Wastewater Plant is up to the challenge of keeping the water in one of Canada's most idyllic regions cleaner than ever.*

**Written by: Kevin Smead   Produced by: Michael Magno**





ter





*Evan Thomas WWTP Headworks and Administration Building*

**S**erving the Kananaskis Country park system west of Calgary in Alberta, the Evan Thomas Water and Wastewater treatment plant is a newly-upgraded, state-of-the-art facility that brings a high standard of clean water to the idyllic tourist destination.

The plant's upgrade was completed on September 12 of this year under a public-private partnership between the Alberta government and contractor EPCOR.

### **The Right Fit**

The Alberta government selected EPCOR to complete the project under a design-build-finance-operate-maintain (DBFOM) model. Scope of the upgrades to Evan Thomas included addressing the treatment plant's current capacity constraints, bringing the treatment plant back to environmental compliance, replacing the aging infrastructure and delivering public health benefits through the introduction of leadership standards





*Evan Thomas WTP and Well Pumphouse*

for the areas potable water.

Lee Ward, Senior Manager of Project Development at EPCOR, said this model made sense for government, as it afforded them a low level of risk.

“The Alberta Government felt this type of model gave them the most risk transfer and protected them from cost overages and performance issues at the plant,” he said. “It also guaranteed what the operations costs were going to be over the next ten years. They really looked at the risk profile of this project and decided that this was the right choice for them. They’re

somewhat risk averse and didn’t want to take that on, neither the construction nor the operations risk.”

As for why the government selected EPCOR and the public-private partnership (P3) model, it came down to a simple factor: cost. The province performed a Public Sector Comparator, in which they compare options and seek out the best value.

“They look at the costs and how much it would cost for them to go with a traditional model and then compare that against the evaluated bids that come in from the proponents,” Ward explained.

# EVAN THOMAS WATER AND WASTEWATER PLANT

“EPCOR were lower than that Public Sector Comparator price, which they decided was good value for them.”

Unfortunately, not everything in the upgrade process went smoothly, though the hiccups were far from those anyone could ever predict.

“We had a one in 300 year flood event in southern Alberta,” Ward said, laughing in near disbelief. “This not only occurred in Kananaskis, but all across the southern part of Alberta. It happened in June 2013 and our whole entire site was

flooded out. In fact, one of our construction trailers floated away.”

Despite these challenges, the project was completed on time with the help of extra manpower and understanding from the Alberta government.

## High-Tech Cleanliness

Now completed, the plant uses advanced systems to ensure that the water running through it is up to the highest standards.

On the water treatment side, the plant not only uses chlorination, but

## PROVIDING SOLUTIONS THAT DELIVER

EPCOR is proud to be a P3 partner for water and wastewater treatment projects including the Evan-Thomas Water and Wastewater Treatment Plants in Kananaskis, Alberta and the City of Regina Wastewater Treatment Plant upgrade.

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an ultraviolet radiation disinfection system, ensuring parasites such as cryptosporidium or giardia—against which chlorine is ineffective—are inactivated and kept from contaminating drinking water.

“It adds an extra barrier, if you will,” Ward said, “an extra level of protection.”

For wastewater, the plant is equipped with a membrane bioreactor system and a UV disinfection system designed to greatly reduce the amount of residual contaminants that wind up in local waters.

“The amount of bacteria is reduced to a very low, strict level before it’s discharged to the river,” Ward said.

Now, the plant may be looking to install a septage receiving station in the near future. This would allow for a greater service area for wastewater collection and eliminate lengthy journeys to other treatment facilities for trucks collecting wastewater from holding tanks currently in place throughout the valley.

### **Thinking Long Term**

Though still focused on the present, the plant’s owners and operators are already planning further down the line.

“The membrane and UV technology are cutting edge for today’s wastewater systems,” Ward said. “We’re a bit ahead of the curve in terms of meeting federal expectations, standards and guidelines. We think that will take us through for the next 10 or 20 years before we have to



**Lee Ward, Senior Manager**

*“Now completed, the plant uses advanced systems to ensure that the water running through it is up to the highest standards.”*

**—Lee Ward, Senior Manager**





implement some major upgrades to the plant.”

While planning decades ahead after a major upgrade might be seen as jumping the gun by some, Ward believes if they start looking at future policies and upgrades now, they can remain a step ahead.

“The Department of Fisheries and Oceans has a mandate in Canada to limit the amount of toxicity that goes into the river,” he explained. “It can be caused by contaminants such as ammonia or nitrogen. Those are all elements of wastewater. As an example of possible changing regulations, in Canada, we’re now looking at going beyond removal of ammonia and nitrogen and controlling the amount of nitrates that are discharged to the river as well. Over the next five years, we could see a requirement to remove nitrates. If we did see that, this plant, with a few tweaks—no major improvements—could handle that, depending on what that new level of requirement is.”

Ward also noted that the plant is ready to grow with the community it serves, allowing for the recreational areas serviced to flourish.

“We have now expanded the plant to allow for expansion of those facilities, which is expected over the next five to 10 years,” he said. “The growth won’t be inhibited by the lack of wastewater facilities. We’ll be able to accommodate that now.”

Thanks to the Evan Thomas Water and Wastewater Plant, those in Kananaskis Country will be able to enjoy clean water for years to come.

## Company Information

### INDUSTRY

Energy

### HEADQUARTERS

Alberta, Canada

### FOUNDED

2014

### REVENUE

\$59.6 Million Project





# **Kwagis Power Limited Partnership**

## Environmentally Conscious Energy

*The Kokish River run-of-river hydroelectric project is more than just a renewable power source as it goes to extra lengths to protect the environment.*

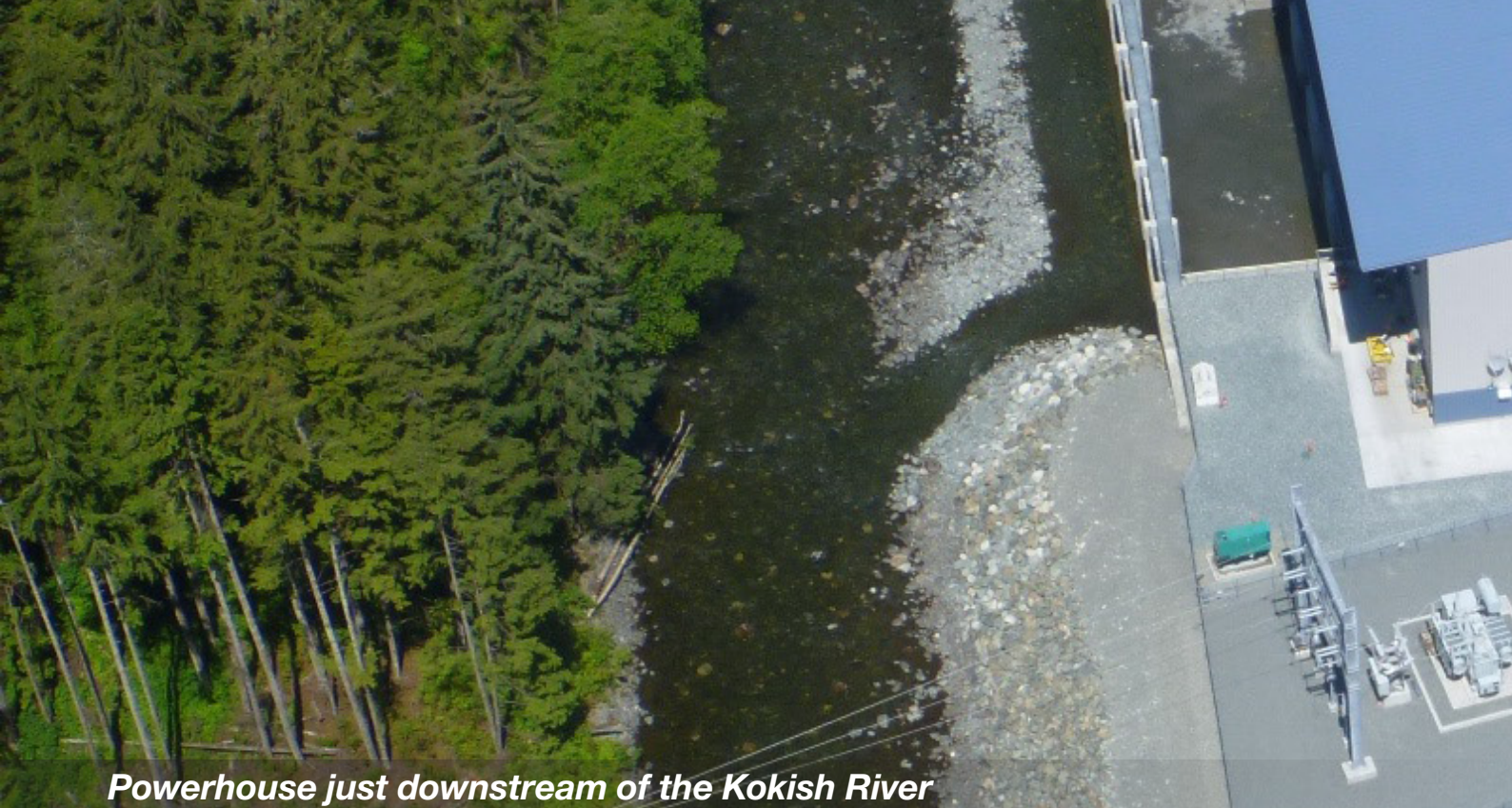
**Written by: Kevin Smead**

**Produced by: Michael Magno**









*Powerhouse just downstream of the Kokish River*

For the ‘Namgis First Nation, respect for the environment is a core value. This all-encompassing belief is focused on the protection and enhancement of the key watersheds in its ancestral lands on northeastern Vancouver Island. The Kokish River watershed is an important one of these.

The river has been home to a number of industrial operations over the years, but none has brought benefits like the Kokish River project. This run-of-the-river operation has an installed capacity of 45 megawatts and generates clean, sustainable energy while enhancing the fish populations in the river.

The project is owned and operated by a partnership between

Brookfield Renewable Energy Partners and the ‘Namgis First Nation, called Kwagis Power. For the ‘Namgis, it’s a requirement that the project’s impact on the river’s community and aquatic life must be a positive one.

“In all of the projects and activities that we do, our key goals are respect for the environment, sound management, self-sufficiency, and sustainable prosperity for our members,” Chief Debra Hanuse said: “These are the values that led us to take on the Kokish project. We are quite proud of our efforts together with our partner Brookfield Renewable. Our project won praise for exceeding environmental requirements and great care was





taken not only to protect but also to enhance fish habitat and fisheries resources in the Kokish watershed. If all goes according to plan, the project will improve fish populations in the river through stream fertilization.”

### **Consideration for Aquatic Life**

Great care was taken to ensure that protection of the river’s aquatic life was at the forefront of the project.

Planning of the project began in 2004 and was followed by years of studying the river system, gathering data, and preparing environmental plans. The result met all the requirements of the ‘Namgis First Nation and of regulators. In late 2011 and early 2012, the project received

its environmental certificate and water licence approvals.

Now, the operation is implementing its detailed environmental monitoring and compensation programs, and using innovative technology to protect the river’s fish populations.

“For example, a feature of this facility is what is called a Coanda screen” Hanuse explained. “The Coanda screen ensures that juvenile salmon and steelhead can safely migrate out to sea.”

The Coanda screen covers the intake weir and prevents the river’s young fish and diverse aquatic life from being drawn into the penstock and turbines. These screens have been successful on other rivers in



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The Kokish Hydroelectric Project demonstrates how quality environmental and engineering services can achieve better results. Ecofish congratulates the Kwagis Power Limited Partnership and the project development team.

### COMPANY PROFILE

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When the Kwagis Power Limited Partnership needed expert help to permit the Kokish Hydroelectric Project, they turned to Ecofish for our reputation as problem solvers. Our innovative mitigation and study designs were key in advancing the project through all phases of development. We continue to support Kwagis during operations, helping them deliver the promise of clean energy.



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ensuring that juvenile salmonids travel down the river with a high rate of survival.

The extensive care paid to environmental concerns isn't the only thing that makes this project unique, however.

### **A Unique Partnership**

Part of what makes the Kokish River run-of-river project special is the partnership between a First Nation and a major energy company. Also, for the first time in Canada, a First Nation is benefiting from the model of funding used for projects developed jointly by the public and private sectors.

The 'Namgis First Nation received \$7.2 million in funding from PPP Canada. This agency manages public-private partnerships (P3s), which are an approach to developing public infrastructure that allows governments to hold the private sector accountable for a project's success over its lifespan. The idea behind the P3s is to transfer to the private sector a major share of the risk associated with infrastructure development, such as cost overruns, schedule delays, unexpected maintenance, or latent defects. Essentially, a P3 project ensures that there aren't

## **SUPPLIER PROFILE**

### **ECOFISH**

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any surprises for taxpayers and the private sector is engaged via a contract for the life of the asset.

“Once the construction phase is done, all the high standards are met, and all of the risk of any delay is avoided, that’s the point where the P3 funding kicks in,” Hanuse explained. “That’s significant for us because P3 funding basically provided us with the means to stand on our own in terms of securing financing to participate in this

project from a source other than our partner. It also will provide us with early benefits, so after repaying our loan, there will still be profits that are available for our community. That’s really important because one of our major goals is to become self-sufficient. The early profits from this project will provide us with the resources that we need to stimulate economic growth in our community and build a better future for our children.”

### The Long Term

When looking at the life span of the asset, it’s important to take a long term view.

“Our initial contract to supply power to BC Hydro is for an initial period of 40 years, so we have guaranteed income for 40 years,” Hanuse said. “It’s a stable and steady revenue stream. But the Kokish facility can have a lifespan of 100 years with good maintenance, so it could provide benefits for generations.”

While the power agreements are important, the long-term environmental impact is still crucial to the ‘Namgis.

“Throughout the lifespan of the



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project there will be environmental monitoring to ensure that the project continues to meet safety and environmental standards,” Hanuse said. “Over time, the environmental monitoring will create opportunities for the members of our nation to become involved in technical support aspects.”

This helps accelerate the First Nation’s progress toward self-sufficiency. Achieving this will require the ability to create and fund projects such as the Kokish River,run-of-river project which can be challenging.

“Access to capital is a challenge that many First Nations governments face because reserve lands can’t be mortgaged, and therefore unless a First Nation has a lot of other assets it can offer for security, it’s difficult for many Nations to secure financing for economic projects,” Hanuse explained. “An initial loan from our partner Brookfield Renewable opened the door for ‘Namgis participation in the Kokish project. The loan from P3 Canada has helped us open the door further. By securing a P3 loan on completion of construction, we’re able to repay our loan to Brookfield and stand as our own as a partner in the Kokish project. The low-interest loan from P3 Canada will allow us to build equity in a green energy project within our core territory and realize benefits much sooner than we would have otherwise.”

Overall, the project is not only a model of how sustainability, energy, and environmental concern can come together, it is also of how the public and private sectors can work together to improve energy infrastructure.

## Company Information

### INDUSTRY

Construction

### HEADQUARTERS

Quebec, Canada

### FOUNDED

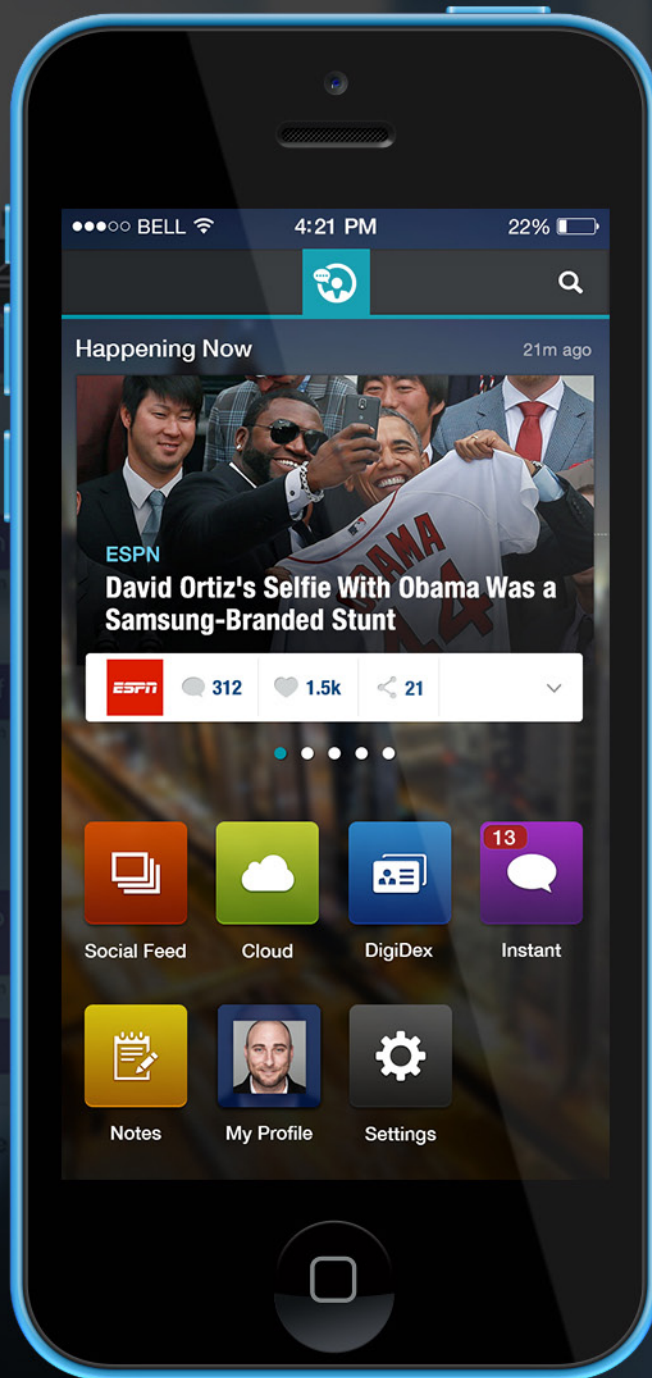
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